PROJECT MANUAL

For

MEDICAL UNIVERSITY OF SOUTH CAROLINA

IDC – MECHANICAL CONSTRUCTION
H51-D159-FW

PSYCHIATRIC INSTITUTE
DATA CENTER CRAC INSTALLATION
H51-N342-FW / 50025

July 17, 2015

MECA Project Number 112185.02

BID DOCUMENTS
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INVITATION FOR CONSTRUCTION SERVICES
INDEFINITE DELIVERY CONTRACT

PROJECT NAME: Mechanical Construction IDC 2015 (Seed Project H51-N342-FW Data Center CRAC)

PROJECT NUMBER: H51-D159-FW (Seed Project H51-N342/MUSC#50025)

DESCRIPTION OF CONSTRUCTION SERVICES (Include Contractor License category/subcategory): Provide indefinite delivery mechanical construction services as directed by MUSC Department of Engineering on an as needed basis. The basis for the award of the IDC contract(s) will be determined by low bid for an actual project as specified, (Project #H51-N342 - Data Center CRAC). Total contract shall not exceed $1,000,000 over a two year period. Individual releases shall not exceed $250,000. Contractor shall possess a Group 5 or greater SC Contractor's License to include MC-HT, MC-AC and MC-PB. The owner intends to award up to four (4) contracts based on this low-bid procurement.

PROJECT LOCATION: Medical University of South Carolina

BID SECURITY REQUIRED? Yes ☒ No ☐

BIDDING DOCUMENTS/PLANS MAY BE OBTAINED FROM:
http://academicdepartments.musc.edu/vpfa/eandf/construction_projects/index.html

PLAN DEPOSIT AMOUNT: $0.00 IS DEPOSIT REFUNDABLE Yes ☐ No ☒ N/A ☒

Bidders must obtain Bidding Documents/Plans from the above listed source(s) to be listed as an official plan holder. Only those Bidding Documents/Plans obtained from the above listed source(s) are official. Bidders that rely on copies of Bidding Documents/Plans obtained from any other source do so at their own risk. All written communications with official plan holders & bidders WILL ☒ WILL NOT ☐ be via email or website posting.

IN ADDITION TO THE ABOVE OFFICIAL SOURCE(S), BIDDING DOCUMENTS/PLANS ARE ALSO AVAILABLE AT:

AGENCY: Medical University of South Carolina

AGENCY PROJECT COORDINATOR: Philip Mauney

ADDRESS: Street/PO Box: 97 Jonathan Lucas Street, MSC 190

City: Charleston State: SC ZIP: 29425-

EMAIL: mauney@musc.edu

TELEPHONE: 843-792-2490 FAX: 843-792-0251

PRE-BID CONFERENCE: Yes ☒ No ☐ MANDATORY ATTENDANCE: Yes ☐ No ☒

PRE-BID DATE: 08/19/15 TIME: 2:00 p.m. PLACE: MUSC Engineering, 97 Jonathan Lucas Street, Parking Garage I, Room PG209, Charleston, SC 29425

BID CLOSING DATE: 09/09/15 TIME: 2:00 p.m. PLACE: MUSC Engineering, 97 Jonathan Lucas Street, Parking Garage I, Room PG209, Charleston, SC 29425

BID DELIVERY ADDRESSES:

HAND-DELIVERY:
Attn: Philip S. Mauney
MUSC Engineering, Parking Garage I, Room PG209
97 Jonathan Lucas Street, Charleston, SC 29425

MAIL SERVICE:
Attn: Philip Mauney
MUSC Engineering, Parking Garage I, Room PG209
97 Jonathan Lucas Street, Charleston, SC 29425

APPROVED BY: ___________________________ DATE: ___________________________

(OSE Project Manager)
AGENCY: Medical University of South Carolina

PROJECT NUMBER: H51-D159-FW  H51-N342  MUSC# 50025

PROJECT NAME: Mechanical Construction IDC 2015 (Seed Project #H51-N342 Data Center CRAC)

PROJECT LOCATION: MUSC, Charleston, SC

DESCRIPTION OF CONSTRUCTION SERVICES (Include Contractor License category/subcategory): Provide indefinite delivery mechanical construction services as directed by MUSC Department of Engineering on an as needed basis. The basis for the award of the IDC contract(s) will be determined by low bid for an actual project as specified, (Project #H51-N342- Data Center CRAC). Total contract shall not exceed $1,000,000 over a two year period. Individual releases shall not exceed $250,000. Contractor shall possess a Group 5 or greater SC Contractor's License to include MC-HT, MC-AC and MC-PB.

The above named Agency hereby solicits bids for the Construction Services Indefinite Delivery Contract shown above. The Invitation for Bids includes the advertisement (SE-655), bid form, Notice of Intent to Award Indefinite Delivery Contract (SE-670), Construction Services Indefinite Delivery Contract (SE-680), General Conditions to Construction Services Indefinite Delivery Contract (SE-685), drawings and specifications (if applicable), and all addenda issued prior to bid opening, all of which are collectively referred to herein as the Solicitation Documents.

The Invitation for Bids is issued pursuant to South Carolina Code § 11-35-3310 and the Manual for Planning and Execution of State Permanent Improvements, Part II (Manual).

1. GENERAL INFORMATION

1.1 Agency may award up to four Indefinite Delivery Contract(s) (IDC) under this solicitation provided the Agency receives and adequate number of responsive and responsible bids. In no event will the Agency award more contracts than the number set forth in the previous sentence.

1.2 Work is to be performed at the following location(s): (Agency inserts location of work, e.g. a particular campus or campuses)

MUSC owned buildings

1.3 The awarded IDC will be for a period not to exceed two years (may not exceed 2 years).

1.4 The awarded IDC allows the Agency to award a total amount of work not to exceed $1,000,000

1.5 Work awarded under the IDC will be awarded using form SE-690, Construction Services IDC Delivery Order.

1.6 The Agency may only award one Delivery Order per project to the contractor. However, a Delivery Order may be amended. A Delivery Order may only be amended in writing signed by both parties using form SE-695, Construction Services Delivery Order Modification.

1.7 Work awarded under the IDC for a single project may not exceed $250,000

1.8 Projects and Delivery Orders may not be divided to avoid the limits set forth in 1.6 and 1.7 above.

1.9 (Agency, check the block for the provision applicable to this solicitation)

☐ The minimum amount of work to be awarded under the IDC is $0.00

☐ Agency does not guarantee a minimum amount of work, nor does it guarantee the size or quantity of any work that is awarded under the IDC.

☒ Agency will provide IDC awardees the opportunity to bid on all Delivery Orders for the services set forth in this Invitation.
1.10 Bidders will agree to perform work for the advertised discipline in the following manner: *(Agency check one)*

☐ The cost of the work to the Agency will be determined using a Multiplier times the cost of the work (unit prices) times the quantity of the work to be performed. Bidders agree to use the following published cost data guide to determine applicable unit prices;

(Name of cost data guide)

☐ The cost of the work to the Agency will be determined using unit prices listed by the Bidder on its Bid Form. No other additions to the cost of the work will be permitted except the cost of Performance and Payment Bonds if required for specific Delivery Orders; or

☒ The cost of the work to the Agency will be determined by competitive bidding of each Delivery Order among all contractors having an active contract that the Agency awarded pursuant to this Invitation for Bids.

1.11 Bidders must be properly licensed in the discipline and the Group Classification to permit an award up to the maximum individual project award set forth in 1.7. Successful bidder(s) must maintain this license for the term of the contract.

2. SOLICITATION DOCUMENTS

2.1 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. Agency will send all addenda modifying the Solicitation Documents to all plan holders of record.

2.2 By submitting a bid, Bidder represents that it has read and understands the Solicitation Documents. Bidders are expected to examine the Solicitation 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 Agency’s attention prior to bid opening. Bidder shall make any requests for substitution, questions, clarifications, or interpretations of the bid documents in writing to the Agency at least 10 days before the Bid Date. The Agency will not give oral instruction prior to bidding nor will any oral instructions to bidders be binding on the Agency.

2.3 The Agency will make corrections, interpretations, or changes that modify the Solicitation Documents by written addendum. As provided in Regulation 19-445.2042(B), if this solicitation provides for a pre-bid conference, nothing stated at the pre-bid conference shall change the Solicitation Documents unless a change is made by written addendum.

2.4 The Agency will not issue addenda later than 120 hours before the date and time specified in the advertisement for receipt of Bids except to withdraw the Invitation for Bids or to extend the date for receipt of bids.

2.5 When the date for receipt of Bids is postponed and there is insufficient time to issue a written Addendum prior to the original Bid Date, Agency 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. BID PREPARATION

3.1 Bidder shall submit its bid using the bid form included in the Solicitation Documents. Bidder shall fill in any blanks on the bid form legibly using an indelible medium. Bidder shall sign its bid in ink or other indelible media. Sums shall be expressed in figures.

3.2 Bidder shall not make stipulations or qualify its 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.

3.3 Pursuant to Title 11, Chapter 35, Section 3020(b)(i) of the South Carolina Code of Laws, as amended, the bid form may set 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 this Section may result in rejection of Bidder’s bid as non-responsive.
3.4 Bid Security: (Agency, check the block for the provision applicable to this solicitation)

☐ Bidder is not required to submit Bid Security with its bid.
☒ Bid shall be accompanied by a Bid Security in an amount of not less than 5%. The Bid Security shall be a bid bond or a certified cashier’s check made payable to the Agency.

3.4.1 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. Failure of the Bidder to enter into a contract with the Agency, furnish such bonds if required, or to correct any Bid deficiencies allowed by law, shall cause bid security to be forfeited to the Agency as liquidated damages, not as a penalty.

3.4.2 If Bidder submits a bid bond as its bid security, the bond shall be written on AIA Document A310, Bid Bond. The bid bond must be accompanied by a certified and current Power of Attorney for the attorney-in-fact who executes the bond on behalf of the surety company. The Bid Bond shall:

a. Be issued by a Surety Company licensed to do business in South Carolina;

b. 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.

c. 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.

3.4.3 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 3.4.

3.4.4 The Agency will retain the Bid Security of those Bidders being considered for award until an IDC has been executed, all bids are rejected, or the time specified in the Solicitation Documents for holding bids open has elapsed, whichever is earlier.

3.5 Submission of Bids: The Bidders shall submit their Bid, Bid Security, if any, and any other documents required by the Solicitation Documents to be submitted with the Bid, in a sealed opaque envelope. Unless hand delivered by the Bidder, the sealed envelop must be addressed to the Agency’s designated purchasing office as shown in the advertisement. The envelope shall be identified on the outside with the Project Name and Number, and the Bidder’s name and address. If the Bidder sends its bid to the Agency 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 advertisement. Whether or not Bidders attend the bid opening, they shall give their bids to the Agency’s procurement officer or his/her designee as shown in the Advertisement prior to the time of the bid opening.

3.5.1 Each copy of the Bid submitted to the Agency shall be signed by the person(s) legally authorized to bind the Bidder to a contract. If the Bid is submitted by an agent of the Bidder, a current Power of Attorney certifying the agent’s authority to bind the Bidder shall be attached to the bid.

3.5.2 The Agency must receive Bids at the designated location before the time and date specified in the Solicitation Documents for receipt of Bids. The Agency will return bids received after the time and date for receipt of Bids unopened.

3.5.3 The official time for receipt of Bids will be determined by reference to the clock designated by the Agency’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.
3.5.4 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.

4. CONDUCT OF BID OPENING AND CONSIDERATION OF BIDS

4.1 Bid Opening:
4.1.1 Agency will publicly open and read aloud Bids received on time.
4.1.2 At Bid Opening, Agency will announce the date and location of the posting of the Notice of Intent to Award IDC.
4.1.3 Agency will send a copy of the final Bid Tabulation to all Bidders within ten (10) working days of the bid opening.
4.1.4 If Agency determines to make an award, Agency will, after posting a Notice of Intent to Award IDC, send a copy of the Notice to all Bidders.
4.1.5 If only one Bid is received, Agency will open and consider the Bid.

4.2 Agency intends to award contracts in the number set forth in the Solicitation Documents to the lowest responsive and responsible bidders.

4.3 Bid Rejection: The Agency reserves the right to reject any and all bids.

4.3.1 Responsiveness:
4.3.1.1 The reasons for which the Agency will reject Bids include, but are not limited to:
   a. Failure by a Bidder to be represented at a Mandatory Pre-Bid Conference or site visit;
   b. Failure to deliver the Bid on time;
   c. Failure to comply with Bid Security requirements, except as expressly allowed by law;
   d. Listing an invalid electronic Bid Bond authorization number on the bid form;
   e. Failure to bid an alternate, except as expressly allowed by law;
   f. Failure to list qualified Subcontractors as required by law;
   g. Showing any material modification(s) or exception(s) qualifying the Bid;
   h. Faxing a Bid directly to the Agency or their representative; or
   i. Failure to include a properly executed Power-of-Attorney with the Bid Bond.

4.3.1.2 The Agency 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 Agency, even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

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

4.4 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]
5. TENDERING CONTRACT, CERTIFICATES OF INSURANCE, AND PERFORMANCE AND PAYMENT BONDS

5.1 After expiration of the protest period, the Agency will tender a signed IDC to the successful Bidder(s). The Bidder(s) shall return the fully executed IDC to the Agency within seven (7) days thereafter. The Bidder(s) shall deliver the required proof of insurance and bonding capacity to the Agency not later than three (3) days following the date of execution of the IDC. Failure to deliver these documents as required shall entitle the Agency 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.

5.2 The IDC will be written on OSE form SE-680, Construction Services Indefinite Delivery Contract.

5.3 After the IDC is fully executed, the Agency may award work to the successful Bidder(s) by issuing a Delivery Order in the manner described in the SE-680 and SE-685, General Conditions to the SE-680.

6. BIDDER CERTIFICATIONS

6.1 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 a 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 a 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 a 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 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.

6.2 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.
6.3 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 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 a 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.

6.4 Ethics Certification: 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 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.
6.5 Restrictions Applicable to Bidders and 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 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.

6.6 Iran Divestment Act Certification: (a) The Iran Divestment Act List is a list published by the State Fiscal Accountability Authority pursuant to Section 11-57-310 that identifies persons engaged in investment activities in Iran. The list is available at the following URL: http://procurement.sc.gov/PS/PS-iran-divestment.phtml. Section 11-57-310 requires the government to provide a person ninety days written notice before he is included on the list. The following representation, which is required by Section 11-57-330(A), is a material inducement for the State to award a contract to you. (b) By signing your Offer, you certify that, as of the date you sign, you are not on the then-current version of the Iran Divestment Act List. (c) You must notify the Procurement Officer immediately if, at any time before posting of a final statement of award, you are added to the Iran Divestment Act List.

7. MISCELLANEOUS PROVISIONS

7.1 Non-Resident 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, SC 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

7.2 Contractor Licensing: Contractors and Subcontractors listed on the Bid Form who are required by the South Carolina Code of Laws to be licensed, must be licensed at the time of bidding.
7.3 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 and 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 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, and (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 Bidder’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”.

7.4 Posting of Notice of Intent to Award IDC:
Notice of Intent to Award, SE-670, will be posted at the following location:

Room or Area of Posting: Bulletin Board Outside of Room 203
Building Where Posted: MUSC Parking Garage I, 2nd Floor
Address of Building: 97 Jonathan Lucas Street, Charleston, SC 29425
WEB site address (if applicable):
1http://academicdepartments.musc.edu/vpfa/eandf/construction_projects/index.html

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

7.5 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 (10) 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.

7.6 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.
7.7 Installation Floater/Builder’s Risk Insurance: Agency insures its property through the South Carolina Insurance Reserve Fund. The Insurance Reserve Fund will not name a third party as an additional insured nor will it allow the Agency to waive subrogation. Pursuant to Section H of the SE-680, Agency may require Bidder to provide an installation floater or builder’s risk insurance when issuing a Delivery Order under the IDC.

7.8 Tax Credit for Subcontracting with Disadvantaged Small Businesses: Pursuant to Section 12-6-3350, a taxpayer having a contract with this State who subcontracts with a socially and economically disadvantaged small business is eligible for an income tax credit equal to four percent of the payments to that subcontractor for work pursuant to the contract. The subcontractor must be certified as a socially and economically disadvantaged small business as defined in Section 11-35-5010 and regulations pursuant to it. The credit is limited to a maximum of fifty thousand dollars annually. A taxpayer is eligible to claim the credit for ten 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. A taxpayer claiming the credit shall maintain evidence of work performed for the contract by the subcontractor. 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. 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. 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.

7.9 Performance & Payment Bonds: Pursuant to SC Code Ann § 11-35-3030, when the Agency awards a Delivery Order to the Indefinite Delivery Contractor in excess of $50,000, the Contractor shall provide Performance and Payment Bonds each in the amount of 100% of the delivery order price. See Section H of the SE-680 for more details.

7.10 Other Special Conditions:

Contractor shall comply with MUSC "MWBE Requirements"

Contractor shall comply with MUSC "Tobacco Free Campus Policy 49"

7.11 Special documents required to be submitted with the bid for this project include:
AIA Document A310 - 2010,
“Bid Bond”

is hereby made part of these documents.

An Original is on file in the Engineer’s Office located at:

Engineer: Mechanical Engineering Consulting Associates, Inc.
2330 Main Street
Columbia, South Carolina 29201
BID SUBMITTED BY: ____________________________________________

(Bidder’s Name)

BID SUBMITTED TO: Medical University of South Carolina

(Owner’s Name)

FOR: PROJECT NAME: Mechanical Construction IDC 2015 (Seed Project #H51-N342 - Data Center CRAC)

PROJECT NUMBER: H51-D159-FW   H51-N342   MUSC#50025

OFFER

§ 1. In response to the Invitation for Indefinite Delivery of Construction Services 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 11-32-3030(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:

(Bidder, check all that apply. Note, there may be more boxes than actual addenda. Do not check boxes that do not apply)

ADDENDA: ☐ #1  ☐ #2  ☐ #3  ☐ #4  ☐ #5

§ 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 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 REPRESENTATIVE PROJECT WORK DESCRIPTION (as indicated in the Bidding Documents and generally described as follows): Installation of two 20-ton Owner furnished Computer Room Air Conditioner Units (CRAC).

$ ___________ (Bidder - insert Bid Amount for Representative Project on line above), which sum is hereafter called the Base Bid.

This bid price will be used to determine which bidders will receive award of an Indefinite Delivery Contract. The lowest responsive and responsible bidder will also receive a Delivery Order to perform the above described work at the price bid. Award and pricing of subsequent Delivery Orders shall be determined by competitive bidding between Indefinite Delivery Contractors receiving an award of an Indefinite Delivery Contract pursuant to this solicitation.
§ 6.2 BID ALTERNATES as indicated in the Bidding Documents and generally described as follows:

ALTERNATE # 1 (Brief Description): Install Owner-furnished remote condensing units

☐ 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)

§ 7. LISTING OF PROPOSED SUBCONTRACTORS PURSUANT TO SECTION 3020(b)(i), CHAPTER 35, TITLE 11 OF THE SOUTH CAROLINA CODE OF LAWS, AS AMENDED: (Owner check box that applies.)

☐ Bidder shall list on Appendix A to this bid form those subcontractors which bidder intends to use to perform the work requiring the license classification and/or subclassification listed therein. Bidder shall only use the listed subcontractors in performance of such licensed work.

☐ Bidder is not required to list subcontractors.

§ 8. TIME OF CONTRACT PERFORMANCE AND LIQUIDATED DAMAGES – INDEFINITE DELIVERY CONTRACT

Bidder agrees that the Date of Commencement of any contract awarded pursuant to the Invitation for Bids shall be established in the Agreement for Indefinite Delivery of Construction Services to be executed by the Owner and the successful Bidder. Bidder also agrees that individual Delivery Orders, if any, shall establish the Date of Commencement, the time to complete the Work included in the Delivery Order (or the completion date), and the amount, if any, the Owner shall retain from the compensation to be paid as Liquidated Damages for each calendar day the actual construction time required to complete the Work exceeds the specified or adjusted time for completion as provided in the Contract Documents.

§ 8.1 TIME OF CONTRACT PERFORMANCE AND LIQUIDATED DAMAGES - REPRESENTATIVE PROJECT

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 120 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 amount 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 amount is intended by the parties as the predetermined measure of compensation for actual damages, not as a penalty for nonperformance.
§ 9. AGREEMENTS
  a) Bidder agrees that this bid is subject to the requirements of the laws of the State of South Carolina.
  b) Bidder agrees that at any time prior to execution of the Construction Services Indefinite Delivery Contract 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 execution of the Construction Services Indefinite Delivery Contract.

§ 10. 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: ____________________________________________

CONTRACTOR’S CLASSIFICATIONS AND SUBCLASSIFICATIONS WITH LIMITATION
SC CONTRACTOR’S LICENSE NUMBER(S): ________________________________
CLASSIFICATION(S) & LIMITS: __________________________________________
SUBCLASSIFICATION(S) & LIMITS: _______________________________________

By signing this Bid, the person signing reaffirms all representation and certification made by both the person
signing and the Bidder, including without limitation, those appearing in Article 2 of the Instructions to Bidders, is
expressly incorporated by reference.

BIDDER’S LEGAL NAME: ________________________________________________
ADDRESS: ____________________________________________________________
__________________________________________________________
TELEPHONE: __________________________________________________________
EMAIL: _______________________________________________________________
SIGNATURE: ___________________________________ DATE: ________________
PRINT NAME: __________________________________________________________
TITLE: ________________________________________________________________
LISTING OF PROPOSED SUBCONTRACTORS PURSUANT TO SECTION 3020(b)(i), CHAPTER 35, TITLE 11 OF THE SOUTH CAROLINA CODE OF LAWS, AS AMENDED.

**INSTRUCTIONS FOR SUBCONTRACTOR LISTING**

1. Completing the form above:
   a. **First Column**: The Owner fills out this column which identifies the contractor/subcontractor specialties for which the bidder must list either a subcontractor or himself as the entity that will perform this work. Subcontractor specialties are identified by contractor license classifications or sub classifications listed in Title 40 of the South Carolina Code of laws. If the owner has not identified a specialty, the bidder does not list a subcontractor.
   b. **Second and Third Columns**: In these columns the Bidder identifies the subcontractors it will use for the work of each specialty listed by the Agency in the First Column. Bidder must identify only the subcontractor(s) who will perform the work and no others. Bidders should make sure that their identification of each subcontractor is clear and unambiguous. A listing that could be any number of different entities may be cause for rejection of the bid as non-responsive. For example, a listing of M&M without more may be problematic if there are multiple different licensed contractors in South Carolina whose names start with M&M.

2. **Subcontractor Defined**: 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. **Subcontractor Qualifications**: Bidder must only list subcontractors who are qualified to perform the work of the listed specialties as specified in the Bidding Documents and who possess a South Carolina Contractor’s license with the license classification and/or subclassification identified by the Owner in the first column on the left. If Bidder lists a subcontractor who is not qualified to perform the work, the Bidder will be rejected as non-responsible.

4. **Use of Own forces**: If under the terms of the Bidding Documents, Bidder is qualified to perform the work of a classification 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 classification.

5. **Use of Multiple Subcontractors**:
   a. If Bidder intends to use multiple subcontractors to perform the work of a single classification listing, Bidder must list the name of each subcontractor Bidder will use, preferably separating the names 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 classification listing and to use one or more subcontractors to perform the remaining work for that classification listing, Bidder must insert his own name and the name of each subcontractor, preferably separating the name of each with the word “and”.
   b. **Optional Listing Prohibited**: Bidder may not list multiple subcontractors for a classification listing, in a form that provides the Bidder the option, after bid opening or award, to choose to use one or more but not all the listed subcontractors to perform the work for which they are listed. A listing, which on its face requires subsequent explanation to determine whether it is an optional listing, is non-responsive. If Bidder intends to use multiple entities to perform the work for a single classification listing, Bidder must clearly set forth on the bid form such intent. Bidder may accomplish this by simply inserting the word “and” between the names 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 an optional listing.

6. If Bidder is awarded the contract, Bidder must use the listed entities to perform the work for which they are listed. Bidder will not be allowed to substitute another entity as subcontractor in place of a subcontractor listed in Appendix A of the Bid Form except for one or more of the reasons allowed by the SC Code of Laws.

7. Bidder’s failure to identify an entity (subcontractor or himself) to perform the work of a subcontractor specialty listed in the first column on the left will render the Bid non-responsive.
CONSTRUCTION SERVICES INDEFINITE DELIVERY CONTRACT

AGENCY: Medical University of South Carolina
PROJECT NAME: Mechanical Construction IDC 2015 (Seed Project H51-N342)
PROJECT NUMBER: H51-D159-FW
AGENCY PROCUREMENT OFFICER: Susan F. Edwards, Controller

THIS AGREEMENT is made this the _____ day of August in the year Two Thousand Fifteen by and between

NAME: Medical University of South Carolina
ADDRESS: MSC 190, 97 Jonathan Lucas Street, Charleston, SC 29425

hereinafter called the “Agency”, and

NAME: ____________________________________________
ADDRESS: ____________________________________________

hereinafter called the “Contractor.”

WHEREAS, the Agency solicited bids for construction services, for the work description below, for projects to be determined, on an as-needed basis:

WORK DESCRIPTION: Mechanical Construction

WHEREAS, Contractor submitted a successful bid to provide the services described above on an as-needed basis.

NOWTHEREFORE, in consideration of the mutual covenants and obligations set forth herein, the Agency and Contractor (hereinafter jointly referred to as the “parties”) agree as follows:

A. Contract Term:
1. The effective date of this agreement shall commence as of the date at the top of this page and the term shall extend until August ___, 2017 (not to exceed two (2) years). The parties may not renew this agreement for an additional term nor may they extend the duration of this agreement by amendment or waiver.

2. Contractor proposals accepted by the Agency within the time limits of the contract may be completed by the Contractor even though the completion date may extend beyond the term of the contract.

B. Contract Documents:
1. Documents forming a part of the contract are:
   a. This Agreement for Indefinite Delivery of Construction Services;
   b. Invitation for Construction Services Indefinite Delivery Contract dated August 2015;
   c. General Conditions to Construction Services Indefinite Delivery Contract, SE-685 (General Conditions);
   d. Contractors completed IDC Bid Form SE-659;
   e. Agency requests for proposals for construction services made pursuant to this contract;
   f. Proposals issued by the contractor in response to the Agency’s request for proposals;
   g. Delivery Orders (SE-690) and Modifications (SE-695) issued by the Agency pursuant to this contract;
   h. Project Manual issued with the Invitation for Construction Services Indefinite Delivery Contract, if any;
   i. Addenda to the Invitation for Construction Services Indefinite Delivery Contract issued prior to the date of bid opening;
   j. The following other documents:
      See Attached List of Drawings for Seed Project H51-D342/MUSC#50025

2. The contract is the entire and integrated agreement between the parties and supersedes prior negotiations, representations, or agreements, whether written or oral.
C. The Work:
1. The Agency will request proposals for construction services on an as-needed basis. The scope of services will be within the general description of work set forth above and within the expenditure limits set forth in the Invitation for Construction Services Indefinite Delivery Contract. The Agency will award work by issuing the contractor a Delivery Order using form SE-690, Construction Services IDC Delivery Order. The method for requesting proposals and awarding Delivery Orders shall be in accordance with the procedures set forth in Part 4 of the General Conditions.

2. The Contractor shall not incur any expense chargeable to the Agency on or about the work of any Delivery Order assigned to this contract until the Delivery Order has been awarded and fully executed by both the Agency and the Contractor.

D. Payment:
Contractor shall make application for payment for work performed under Delivery Orders and the Agency shall make payment in the form and manner set forth in Part 4.3 of the General Conditions.

E. Termination:
The parties may terminate the contract only in the manner provided in Part 9 of the General Conditions.

F. Dispute Resolution:
The parties shall resolve all disputes in the manner provided in Part 5 of the General Conditions.

G. Representatives:
1. Agency’s Representative:
Agency designates the individual listed below as its Representative, which individual has the authority and responsibility set forth in Part 2.2 of the General Conditions:

   NAME: Philip Mauney
   TITLE: Director of Engineering
   ADDRESS: MUSC, MSC 190, Charleston, SC 29425
   TELEPHONE: 843-792-2490 FAX: 
   EMAIL: mauney@musc.edu

2. Contractor’s representative:
Contractor designates the individual listed below as its Contractor's Representative, which individual has the authority and responsibility set forth in Part 3.2 of the General Conditions:

   NAME: 
   TITLE: 
   ADDRESS: 
   TELEPHONE: FAX: 
   EMAIL: 

3. Neither the Agency nor the Contractor shall change their representatives without ten days written notice to the other party.

H. Insurance and Performance & Payment Bonds:
The Contractor shall purchase and maintain insurance and provide Performance and Payment Bonds as set forth in Parts 3.18 and 3.19 of the General Conditions.

AGENCY: 
BY: 
(Signature of Representative)
PRINT NAME: Susan F. Edwards
PRINT TITLE: Controller
DATE: 

CONTRACTOR: 
BY: 
(Signature of Representative)
PRINT NAME: 
PRINT TITLE: 
DATE: 
LIST OF DRAWINGS FOR SEED PROJECT H51-D342/MUSC#50025

CS-1 Drawing Cover Sheet
M010 Mechanical Symbols Legends Notes and Schedules
M011 Mechanical Details – Alternate No. 1
M100 Third Floor Mechanical Demolition Plan
M101 Third Floor Mechanical Renovation Plan
M102 Third Floor Mechanical Demolition Plan – Alternate No. 1
M103 Sixth Floor Mechanical Renovation Plan
M104 7th Level Roof Mechanical Plan
M105 Refrigerant Piping Riser Diagram
E001 Electrical Details
ED01 Psychiatric Institute Third Floor Electrical Demolition Plan
E101 Psychiatric Institute Third Floor Electrical Plan – New Work
E201 Psychiatric Institute Roof Electrical Plans – Alternate No. 1
SE-685
GENERAL CONDITIONS TO CONSTRUCTION SERVICES INDEFINITE DELIVERY CONTRACT

AGENCY: Medical University of South Carolina
PROJECT NAME: Mechanical Construction IDC 2015  (Seed Project Data Center CRAC)
PROJECT NUMBER: H51-D159  Seed Project# H51-N342  MUSC#50025

CONTRACTOR:

1. GENERAL INFORMATION
1.1 Contract Documents: The Contract Documents are identified in the Construction Services Indefinite Delivery Contract (the “Contract”). The Contract can only be modified by written agreement signed by both the Agency and the Contractor. The Contract Documents do not create a contractual relationship between the Contractor and any separate Contractor having a contract with the Agency; between the Agency and any subcontractor to the Contractor of any tier; or between any persons or entities other than the Agency and the Contractor.

1.2 Delivery Order: A Delivery Order is a written order issued by the Agency to the Contractor under the terms and conditions of the Contract, directing the Contractor to perform the work described therein. The Agency shall issue the Delivery Order on Form SE-690, Construction Services IDC Delivery Order.

1.3 Contractor shall not incur any expense chargeable to the Agency on or about the work of any Delivery Order assigned to this contract until the Delivery Order has been awarded and fully executed by both the Agency and the Contractor.

1.4 The Contract is subject to strict expenditure and term limits set forth in State Law at S.C. Code Ann. § 11-35-3310 and further explained in the Manual for Planning and Execution of State Permanent Improvements, Part II (the “Manual”). Any modification to the Contract purporting to exceed these strict limits are null and void. The limits applicable to this Contract are set forth in Part I of the Invitation for Indefinite Delivery of Construction Services.

1.5 The Work: As used herein, the “Work” means any work required of or performed by the Contractor pursuant to each and every Delivery Order issued by the Agency under this Contract.

2. AGENCY
2.1 The term “Agency” means the Agency or the Agency’s Representative.

2.2 Representative: The Agency’s representative designated in Part G(1) of the agreement shall have the authority to bind the Agency with respect to all matters regarding the Contract and requiring the Agency’s approval or authorization.

2.3 Information to the Contractor: The Agency shall furnish, with reasonable promptness, information requested by the Contractor that is necessary for the performance of the Contract Services and under the Agency’s control. Any information or documentation provided by the Agency to the Contractor relating to the Project or Site is provided only for the convenience of the Contractor. The Agency makes no representation or warranty to as to the sufficiency, completeness, or accuracy of such information.

2.4 Utility Access and Use:
☒ If this box is checked, the Agency shall allow the Contractor to use reasonable quantities of water and electricity for construction purposes without charge, as long as these utilities are available and in close proximity to the Work area. Contractor shall be conscientious in controlling excessive or frivolous use of the utilities or the Agency may charge the Contractor for wasteful usage.

2.5 Sanitary Facilities: (Agency, check box that applies to this contract)
☒ The Contractor may use those sanitary facilities designated by the Agency in each Delivery Order as available for use.
☐ The Contractor may not use the Agency’s sanitary facilities. The Contractor shall provide sanitary facilities at the job site and maintain same in a clean and sanitary condition for the use of its employees and employees of its subcontractors for the duration of construction. The sanitary facilities shall conform to the requirements of the South Carolina Department of Health and Environmental Control.
2.6 Permits, Assessments, and Easements: The Agency shall secure and pay for all building permits, zoning permits, assessments, and easements except as required by any Delivery Order issued under the terms of the contract.

2.7 Agency's Architect-Engineer (A-E): The Agency may retain an independent A-E to prepare design documents for the work of a specific Delivery Order. In such event, the A-E will be a representative of the Agency during the performance of such work through final completion of such work. In the absence of an independent A-E, the Agency will assign one of its employees to act as A-E for the work of a particular Delivery Order. The Contractor shall cooperate with the A-E in the performance of its duties. The A-E will perform the following duties:

a. The A-E will make periodic visits to the site during contract administration to become familiar with the progress of the work and to determine if the work is generally progressing in accordance with the contract documents.

b. The A-E will make recommendations to the Agency as to acceptance or rejection of the work and, upon the Agency's concurrence, communicate the acceptance or rejection of the work to the Contractor.

c. The A-E will review and approve or reject shop drawings and samples submitted by the Contractor showing details/finishes of the work proposed to be installed.

d. The decision of the A-E in all matters relating to design and interpretation of contract documents shall, subject to the provisions of Part 5 (Dispute Resolution) be final.

e. The A-E will not be responsible for construction means, methods, techniques, procedures and safety measures in the performance of the work nor acts or omissions of the Contractor, subcontractors or any other entity performing work on the site.

f. The A-E will review requests for payment, and make recommendations to the Agency for approval or rejection of all or part of the request.

g. The A-E will prepare change orders or change directives for review and approval by the Agency.

2.8 Construction by Agency: The Agency may do work with its own forces or award separate contracts for work on the same project as may be awarded by Delivery Order under this contract. The Contractor shall allow access to the site by the Agency's work force or separate Contractor(s), and shall cooperate in coordinating the progress of the work with the Agency. The Agency shall have the responsibility to coordinate the activities of the various Contractors working at the project location.

3. CONTRACTOR

3.1 The term "Contractor" means the Contractor or the Contractor's Representative.

3.2 Representative: The Contractor's representative designated in Part G(2) of the Agreement shall have the authority to bind the Contractor with respect to all matters regarding the Contract and requiring the Contractor's approval or authorization.

3.3 Supervision and Performance of the Work: The Contractor shall supervise, perform, and direct the Work, using the professional skill, care, and attention reasonably required for similar projects. The Contractor shall be solely responsible for and have control over means, methods, techniques, sequences, and procedures and for coordinating the Work, unless the Contract Documents give other specific instructions concerning these matters. The Contractor agrees to faithfully and fully perform the terms of this Contract, and any Delivery Order issued under this Contract and shall complete the Work in accordance with the Contract Documents and deliver the Work to the Agency free and clear of all liens and claims. The Contractor shall, at all times during the progress the Work, employ enough skilled workers and have on hand and maintain an adequate supply of materials and equipment to complete the Work in accordance with the construction schedules agreed to in applicable Delivery Orders.

3.4 Employee Discipline: The Contractor shall enforce discipline and good order among the Contractor's and subcontractors' employees, and other persons carrying out the Work. Contractor shall be responsible to the Agency for acts and omissions of the Contractor's employees, subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

3.5 Safety: The Contractor shall comply with all federal and state work site safety requirements and shall be responsible for initiating, maintaining, and supervising reasonable safety precautions and programs in connection with the performance of the Contract Services. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable and appropriate protection to prevent damage, injury or loss to (1) employees on the Work and other persons who may be affected thereby; (2) the Work and materials and equipment to be incorporated therein; and (3) other property at the site of the Work or adjacent thereto.
3.6 Waste Materials and Rubbish: The Contractor shall keep the premises and surrounding areas free from accumulation of waste materials or rubbish caused by the Work. Upon Final Acceptance of the Work, the Contractor shall, to the Agency’s satisfaction, remove from and about the site, all waste materials, rubbish, surplus material, and Contractor’s tools, equipment, machinery.

3.7 Recycling: The Contractor shall give preference to the use of products containing recycled content in the performance of the Work. The Contractor shall cooperate with any recycling program established for the site of the work of any Delivery Order or available through the state or a political subdivision of the state.

3.8 Access to the Work: The Contractor shall provide the Agency with unrestricted access to the Work in preparation and progress wherever located.

3.9 Use of Site: The Contractor shall confine its operations to the portions of the site identified in each Delivery Order or otherwise approved by the Agency, and shall not unreasonably encumber the portions of the site used for the Work with materials, equipment, or similar items. The Contractor and all subcontractors shall use only such entrances to the Site as are designated by the Agency. During occupied hours, Contractor shall limit construction operations to methods and procedures that do not adversely affect the environment of occupied spaces within the Site, including but not limited to creating noise, odors, air pollution, ambient discomfort, or poor lighting.

3.10 Correction of the Work:

3.10.1 The Agency shall have the right and authority to reject Work that does not conform to the Contract Documents. The Contractor shall promptly correct Work rejected by the Agency for failing to conform to the requirements of the Contract Documents, whether or not fabricated, installed or completed. The provisions of this Section 3.10 apply to Work done by subcontractors as well as to Work done by direct employees of the Contractor.

3.10.2 If the Contractor fails to correct the Work, or any portion thereof, that is not in accordance with the requirements of the Contract Documents or fails to carry out Work or provide information in accordance with the Contract Documents, the Agency may make written demand upon the Contractor to cure its defaults within seven days. Within seven days after receipt of the Agency’s demand, the Contractor shall cure its defaults unless the default is such that it is not capable of cure within seven days. If the default is such that it is not capable of cure within seven days, the Contractor shall reach an agreement with the Agency on a plan to cure its defaults within five days after receipt of the Agency’s demand. The Contractor shall commence and diligently and continuously pursue the cure of such defaults in accordance with the agreed plan. If the Contractor fails to cure its defaults as heretofore provided, the Agency may order the Contractor, in writing, to stop the Work, or any portion thereof, until the Contractor has eliminated the cause for such order or has provided the Agency with a plan for corrective action acceptable to the Agency. The right of the Agency to stop the Work shall not give rise to a duty on the part of the Agency to exercise this right for the benefit of the Contractor or any other person or entity.

3.10.3 Correction after Substantial Completion: If, within one year after the date of Substantial Completion of the Work, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Agency to do so. The Contractor’s obligation set forth in this Part 3.10.3 is in addition to the Contractor’s obligations under Part 3.12.

3.10.4 Nothing contained in this Part 3.10 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of such time period as described in this Section 3.10 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor’s liability with respect to the Contractor’s obligations other than specifically to correct the Work.

3.11 Manufacturers’ Warranties: At Final Acceptance of the Work, the Contractor shall furnish the Agency two original complete sets of all manufacturers’ warranties, guarantees, parts lists, and literature applicable to equipment, systems, fittings, and furnishings included in the Work (collectively referred to as “Manufacturers’ Warranties”), completed in favor of the Agency. These Manufacturers’ Warranties are in addition to and not in lieu of the Contractor’s warranty set forth in Part 3.12, and the Agency is entitled to look to the Contractor for remedy in all cases where the Contractor’s warranty applies regardless of whether a Manufacturer’s Warranty also applies. The Agency shall acknowledge receipt of the sets of Manufacturers’ Warranties on the set itself, and the Contractor shall cause six (6) copies of an acknowledged set to be made and furnished to the Agency. All Manufacturers’ Warranties will be for applicable periods and contain terms not less favorable to the Agency than those terms that are standard for the applicable industries, and will either be issued in the first instance in the name of and for benefit of the Agency, or be in a freely assignable form and be assigned to the Agency without limitations.
3.12 Contractor Warranty: The Contractor warrants to the Agency that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from faults and defects not inherent in the quality required or permitted, that the materials, equipment and Work will conform with the requirements of the Contract Documents, and that the Work will be free from any encumbrances, liens, security interests, or other defects in title upon conveyance of title to the Agency. The Contractor's warranty excludes remedy for damage or defect to the extent caused by (i) abuse by anyone other than the Contractor or those for whose acts the Contractor is responsible, (ii) modifications not approved or executed by the Contractor or subcontractors, (iii) improper or insufficient maintenance or operation not the fault of the Contractor or those for whose acts the Contractor is responsible, or (iv) normal wear and tear under normal usage. If required by the Agency, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment and the recommended maintenance thereto to meet the requirements of this Part.

3.13 After completion of the Work but no later than the date of Substantial Completion, the Contractor shall submit operation and maintenance manuals, recommended spare parts lists, and copies of all warranties to the Agency. As-Built drawings shall be submitted no later than the Final Completion Date.

3.14 Compliance with Law:
3.14.1 The Contractor shall comply with and give all notices required by federal, state, county, and municipal laws, ordinances, regulations, and orders bearing on the performance by the Contractor of the duties or responsibilities under this Contract.

3.14.2 The Contractor shall promptly remedy any violation of any such law, ordinance, rule, regulation, or order that comes to its attention to the extent that the same results from its performance of the Work. The Contractor shall promptly, and in no event later than the close of the next business day following receipt, give notice to the Agency by telephone, with confirmation in writing, of receipt by the Contractor of any information relating to violations of laws, ordinances, rules, regulations, and orders.

3.15 Subcontractors:
3.15.1 The Contractor shall furnish in writing to the Agency for its approval the names of the subcontractors to whom the Contractor plans to award any portion of the Contract Services.

3.15.2 Contracts between the Contractor and subcontractors shall require each subcontractor, to the extent of the Contract Services to be performed by the subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by the Contract Documents, assumes toward the Agency.

3.15.3 The Contractor shall be responsible to the Agency for acts and omissions of the subcontractors, their agents and employees, and any other persons performing portions of the Contract Services, to the same extent as the acts or omissions of the Contractor hereunder.

3.15.4 The Iran Divestment Act List is a list published by the State Fiscal Accountability Authority pursuant to Section 11-57-310 that identifies persons engaged in investment activities in Iran. The list is available at the following URL: http://procurement.sc.gov/PS/PS-Iran-Divestment.phtml. Consistent with Section 11-57-330(B), the Contractor shall not contract with anyone to perform a part of the Work, if, at the time you enter into the subcontract, that person is on the then-current version of the Iran Divestment Act List.

3.16 Publicity: Contractor shall not publish any comments or quotes by State employees, or include the State in either news releases or a published list of agencies, without the prior written approval of the Agency.

3.17 Indemnification
3.17.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Agency and the Agency's agents and employees from and against claims, damages, losses and expenses, including, but not limited to, reasonable attorney's fees, arising out of or resulting from performance of the work of a Delivery Order, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), including loss of use resulting therefrom, but only to the extent caused by negligent acts or omissions of the Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder.

3.17.2 In claims against any person or entity indemnified under Part 3.17.1 by an employee of the Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Part 3.17 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for Contractor or a subcontractor under workers' or workmen's compensation acts, disability benefit acts, or other employee benefit acts.
3.18 Insurance

3.18.1 Commercial General Liability, Business Automobile Liability, and Worker’s Compensation: The Contractor shall purchase from and maintain, in a company or companies lawfully authorized to do business in South Carolina, such insurance as will protect Contractor from claims set forth below, which may arise out of or result from Contractor’s operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

(a) claims under workers’ compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;

(b) claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor’s employees;

(c) claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor’s employees;

(d) claims for damages insured by usual personal injury liability coverage;

(e) claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

(f) claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

(g) claims for bodily injury or property damage arising out of completed operations; and

(h) claims involving contractual liability insurance applicable to the Contractor’s obligations under Part 3.17, Indemnification.

3.18.1.1 The insurance required by Part 3.18.1 shall be written for not less than the limits of liability specified below or required by law, whichever is greater. Coverage shall be written on an occurrence basis and shall be maintained without interruption from the date of commencement of the Work until 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 set forth in Part 3.10 or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

(a) COMMERICAL GENERAL LIABILITY:
   (1) General Aggregate (per project)..................................................$1,000,000
   (2) Products/Completed Operations.................................................$1,000,000
   (3) Personal and Advertising Injury.............................................$1,000,000
   (4) Each Occurrence ........................................................................$1,000,000
   (5) Fire Damage (Any one fire)............................................................$50,000
   (6) Medical Expense (Any one person)..............................................$5,000

(b) BUSINESS AUTO LIABILITY (including All Owned, Non-owned, and Hired Vehicles):
   (1) Combined Single Limit ..............................................................$1,000,000 OR
   (2) Bodily Injury & Property Damage (each).......................................$750,000

(c) WORKER’S COMPENSATION:
   (1) State Statutory
   (2) Employers Liability .................................................................$100,000 Per Acc.

   $500,000 Disease, Policy Limit
   $100,000 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 Part 3.18.1. The umbrella policy limits shall not be less than $5,000,000.
3.18.1.2 Prior to commencement of the Work, and thereafter upon replacement of each required policy of insurance, Contractor shall provide to the Agency a written endorsement to the Contractor’s general liability insurance policy that:

(i) names the Agency as an additional insured 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 insured 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 Agency as secondary and noncontributory.

3.18.1.3 Before commencement of the Work, and thereafter upon renewal or replacement of each required policy of insurance, Contractor shall provide to the Agency a signed, original certificate of liability insurance (ACORD 25). Consistent with this Part 3.18.1, the certificate shall identify the types of insurance, state the limits of liability for each type of coverage, name the Agency 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 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 Agency as an additional insured for claims made under the Contractor’s completed operations, and otherwise meeting the above requirements, shall be submitted with the Contractor’s final request for payment for the Work and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Part 3.18.1. 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.

3.18.1.4 A failure by the Agency either (i) to demand a certificate of insurance or written endorsement required by Part 3.18.1, or (ii) to reject a certificate or endorsement on the grounds that it fails to comply with Part 3.18.1, shall not be considered a waiver of Contractor’s obligations to obtain the required insurance.

3.18.2 Property Insurance:

3.18.2.1 Builder’s Risk Insurance: Unless otherwise specified in the Delivery Order, at the time of execution of a Delivery Order and before commencing work under that Delivery Order, Contractor shall purchase property insurance written on a builder’s risk “all risk” or equivalent policy form on a replacement cost basis. Contractor shall maintain such property insurance until the Agency has made final payment for the work of the Delivery Order or until no person or entity other than the Agency has an insurable interest in the property required by this Paragraph 3.18.2 to be covered, whichever is later. This insurance shall include and be in an amount sufficient to cover at all times during the performance of the work of the Delivery Order, the interests of the Contractor, Subcontractors and Sub-subcontractors in the Delivery Order Project. The property insurance shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, false work, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect’s and Contractor’s services and expenses required as a result of such insured loss.

3.18.2.2 Equipment Breakdown Insurance: In the event the Contractor installs and runs and/or operates (whether for testing or other purposes) heating, air conditioning, and electrical machinery and equipment, the Contractor shall purchase and maintain equipment breakdown (boiler and machinery) insurance, which shall specifically cover such objects during installation and until final acceptance by the Agency. This insurance shall include interests of the Agency, Contractor, and subcontractors at any tier in the Work, and the Agency and Contractor shall both be named insured.

3.18.2.3 Before an exposure to loss may occur, the Contractor shall file with the Agency a copy of each policy that includes insurance coverage required by this Part 3.18.2. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project.
3.18.2.4 Waiver of Subrogation: The Agency and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, for damages caused by fire or other causes of loss to the extent the property insurance provided by the Contractor pursuant to this Section 3.18.2 covers and pays for the damage, except such rights as they have to proceeds of such insurance held by the Contractor. The Agency or Contractor, as appropriate, shall require of the subcontractors, sub-subcontractors, agents and employees, each of the other, by appropriate written agreements, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

3.19 Performance and Payment Bonds: Prior to beginning work on a Delivery Order, the Contractor shall deliver to the Agency a Performance Bond and a Labor & Material Payment Bond if the Contractor’s agreed upon compensation for the Work of the Delivery Order exceeds $50,000 or the Agency requests such bonds. Each bond shall be in the amount of 100% of the amount of the Delivery Order. The Contractor’s Performance Bond shall be in the form of Form SE-355 and the Labor & Material Payment Bond shall be in the form of Form SE-357. The surety company providing the Bonds 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.” Contractor’s failure to provide bonds as herein required shall be an event of default justifying the Agency, in its sole discretion, in terminating this Contract for cause.

3.20 Shop Drawings and Samples:
3.20.1 Contractor shall prepare or cause to be prepared shop drawings for fabricated items. Shop drawings shall consist of drawings, diagrams, illustrations, schedules, brochures, and other data which are prepared by the Contractor, sub-Contractor, manufacturer, supplier, or distributor and depict that portion of the work. Shop drawings shall be submitted, reviewed, and approved by the Contractor prior to submitting to the Agency and A-E. Shop drawings approved by the Contractor shall bear a stamp denoting that they have been review and are “approved” or “approved as noted” or similar designation. Contractor shall submit the number of sets as specified in the Delivery Order plans or specifications or in the absence of a specification submit enough copies for the Agency to retain two copies plus the number desired to be returned to the Contractor. The Agency and A-E will review the shop drawings with reasonable promptness but only for conformity with the design.

3.20.2 Contractor shall submit samples as required by the Delivery Order. Samples are physical examples furnished by the Contractor of sufficient size and quantity to provide a good representation of the material proposed to be installed. Samples submitted will not be returned unless requested by Contractor and agreed to by the A/E. The Contractor shall pay shipping costs. The final installed product shall match the approved sample.

3.21 Inspection and Testing of Materials:
3.21.1 The Contractor shall leave uncovered all areas of work that will be covered that are called out in the construction documents to be left uncovered, or the Agency or A-E requests to be left uncovered prior to being inspected. The Contractor shall give adequate notice to the Agency and A-E of the time requested for an inspection of areas to be covered.

3.21.2 If the Contractor covers areas that were to be left uncovered, the Contractor shall cause the area to be uncovered for inspection. After being inspected, the Contractor shall repair the area with craftsmen skilled in the appropriate trades needed for the repair at no additional cost to the Agency.

3.22 Substitutions:
3.22.1 The Contractor shall submit proposed substitutions to the Agency for the Agency’s approval prior to execution of each Delivery Order.

3.22.2 Reference in the Contract 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. The Contractor may use the products of other another manufacturer’s provided it is an "approved equal" that meets or exceeds the specification for the specified product. The Contractor must submit adequate information about the product to show that the submitted product meets the level of quality as the product specified.

3.22.3 The Contractor shall not substitute any product, article, appliance, equipment, or material that is specified without prior written approval of the Agency.
3.23 Receiving and Storing Materials and Equipment: The Contractor shall have an authorized person or persons to receive all items delivered to the site of the Work and shall properly unload, check for completeness of shipment, and in-transit damage. The Contractor shall properly handle and store materials, supplies, equipment etc. in accordance with the contract documents or manufacturer's printed instructions for each product.

3.24 Schedule and Reports: Promptly after the Agency issues a Delivery Order, the Contractor shall present a construction schedule in a form satisfactory to the Agency. At intervals agreed upon in the Delivery Order, the Contractor shall update the schedule showing the actual progress of the work and adjustment in completion dates. If the work falls behind schedule, the Contractor shall present a plan for completion of the work by the scheduled date for completion.

3.25 Time for Completion:
3.25.1 Each Delivery Order signed by the Agency and Contractor shall set forth the time for completion of the Work specified therein. Contractor shall make a request for extension of time within seven days of the event giving rise to the request. The Contractor shall adequately document delays of the work that are due to circumstances beyond the control of the Contractor and shall submit the documentation to the Agency with any request for an extension. In the event of ongoing delay, the Contractor shall notify the Agency in its request for an extension of time that the cause of delay is ongoing. In such case, the Contractor shall supplement its request the cause of delay ends or the project is completed, whichever is sooner.

3.25.2 The Agency will review each request for time extension and equitably adjust the time for completion where (1) the event of delay actually impacted the critical path of the project and was beyond the control of the Contractor, and (2) completion of the Work was actually delayed.

4. CONTRACT ADMINISTRATION

4.1 Delivery Order - Cost Proposal: From time to time, the Agency will request a cost proposal for specific work and provide the Contractor adequate project information necessary to prepare a cost proposal. The Contractor shall prepare a cost proposal to complete the Work as requested. Unless specified by the Agency in its request, the cost proposal shall include the time frame for completion of the work. The Contractor shall submit the cost proposal to the Agency within one week of the request or as otherwise agreed upon by the Agency. The cost proposal shall be prepared according to the following method: (Agency, check box that applies to this contract)

☑ Multiplier – Unless the Contractor proposes to provide work at a lower price, the Contractor shall use the multiplier, as bid, times the unit prices contained in the cost data guide specified in the contract documents, times the number of units of Work. The unit prices in the cost data guide include all labor, supervision, material, equipment, taxes, overhead (including but not limited to insurance, performance bond, and payment bond premiums), delivery, setup, installation, and profit. The Contractor may not add any additional mark-up to its price. If the Contractor chooses to subcontract some or all of the Work, the Contractor must still use its multiplier with the cost data guide for pricing the subcontracted work. However, if the work of the proposed Delivery Order is such that the Contractor may legally act as the sole prime Contractor under the licensing laws of this State and the subcontracted work (1) is outside the Contractor's license; (2) is outside the license of any subcontractor listed in Section 7 of the bid; (3) is outside the scope of services covered by the Contract; and (4) does not exceed 20% of the total value of the work of the proposed Delivery Order, the Contractor may include a markup not to exceed 1% on the price of such subcontracted work. If the Contractor proposes not to use its multiplier and the cost data guide as the basis for the price of its work or subcontracted work, it must document that the proposed price is lower than the price would be if the Contractor used the multiplier and cost data guide.

☐ Unit Prices – Unless the Contractor proposes to provide work at a lower price, the Contractor shall use the unit prices, as bid, times the number of units required for the Work to arrive at an extended price for that item of Work. The total of all extended prices becomes the Contractors price for the cost proposal. The unit prices include all labor, supervision, material, equipment, taxes, overhead (excluding but not limited to insurance), delivery, setup, installation, and profit. The Contractor may not add any additional mark-up to its price. If the Contractor chooses to subcontract some or all of the Work, the Contractor must still use the unit prices bid for pricing the subcontracted work. If the Contractor proposes not to use the unit prices bid as the basis for the price of its work or subcontracted work, it must document that the proposed price is lower than the price would be if the Contractor used the multiplier and cost data guide.

☒ Low Bid – The Contractor shall competitively bid the Work against at least three other Indefinite Delivery Contractors. The Delivery Order bid price shall include all labor, supervision, material, equipment, taxes, overhead (including but not limited to insurance), delivery, setup, installation, and profit. Under this pricing method, the Agency will award the Delivery Order to the lowest bidder.
4.2 Changes in the Work of a Delivery Order:

4.2.1 Any changes in the work must be approved by the Agency and executed by using form SE-695, Construction Services Delivery Order Modification. The SE-695 must be signed by the Contractor and Agency. Except when the Delivery Order was awarded on the basis of competitive bids, the cost of any change order shall be calculated using the same method as pricing the Delivery Order.

4.2.2 In the absence of a total agreement concerning the item(s) for a change order, a Construction Change Directive shall be used.

4.2.3 Agreed Overhead and Profit Rates:
For any adjustment to the Delivery Order 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).

4.3 Payments:

4.3.1 Contractor may submit monthly applications for payment for the Work of Delivery Orders scheduled to last two months or more in duration. Contractor shall submit only one application for payment for the Work of Delivery Orders scheduled to last less than two months in duration.

4.3.2 Delivery Orders Awarded by low bid: If the Contractor intends to submit more than one application for payment, the Contractor shall submit to the A-E, within ten days of Delivery Order award, a schedule of values allocating the entire Delivery Order Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the A-E may require. This schedule, unless objected to by the A-E, shall be used as a basis for reviewing the Contractor’s Applications for Payment. Contractor shall base its monthly applications for payment on work completed up to the date of the application using the approved schedule of values. The sum of all payments to the Contractor shall not exceed the agreed upon cost of the work set forth in the Delivery Order as adjusted by subsequent modifications to the Delivery Order, if any.

☐ 4.3.3 Contractor shall base its applications for payment on work completed up to the date of the application using the units of measure and prices contained in the (Agency, check box that applies to this Contract)
☐ Unit price schedules in the cost data guide incorporated by the Contract Documents
☐ Unit price schedule in Contractors bid.

4.3.3 Contractor’s applications for payment may include materials suitably stored on site for use in the Work provided the Contractor submits:

a. Proof of purchase & delivery;
b. Documentation showing the location of the material;
c. Certificate of insurance for the material with adequate coverage showing the Agency as the certificate holder.

4.3.4 The Agency will make payments to the Contractor for completed work based on the actual units or quantity of work completed. The Agency will make payments on the undisputed amounts of an application for payment within 21 days of receipt of the application.

4.3.5 Subcontractor Payments (Chapter 6 of Title 29 of the South Carolina Code of Laws, as amended): The Contractor shall pay each subcontractor no later than seven (7) days after receipt of payment from the Agency the amount to which the subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the subcontractor’s portion of the Work. By appropriate agreement with its subcontractors, the Contractor shall require each subcontractor to make payments to Sub-subcontractors in a similar manner.

4.3.6 If the Agency does not pay the Contractor within seven (7) days after the time established in Part 4.3.2 the undisputed amount of a payment request, then upon seven (7) additional days written notice to the Agency, the Contractor may stop the Work until the Contractor has received payment of the undisputed amount owing. The Contract Time and the Contract Sum shall be equitably adjusted 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.

4.3.8 Final Payment: Upon final payment by the Agency to the Contractor for the Work of a Delivery Order, all rights, title, and interest in and to all improvements and equipment constructed or installed on the premises shall vest in the Agency at no additional cost, free and clear of all any liens and encumbrances created or caused by the Contractor.

4.3.9 Withholding of Payments: Payments may be withheld to the extent of, and on account of (1) defective Work not remedied, or Work not performed in accordance with the Contract Documents; (2) claims filed by third parties; (3) failure of the Contractor to make payments promptly to the subcontractors for labor, materials, or equipment; (4) persistent failure to carry perform the Work in accordance with the Contract Documents; (5) failure by the Contractor to perform its obligations under the Contract Documents; or (6) a default by the Contractor under the Contract Documents. The Agency shall promptly notify the Contractor of any reason for withholding payment.

4.4 Delivery Order Completion and Closeout: Upon completion of all Work, the Contractor shall notify the Agency of its completion. The Agency shall schedule a Final Inspection and allow the Contractor to demonstrate that all equipment and systems operate as designed. The Agency may elect to have other persons, firms or agencies participate in the inspections. Projects exceeding the Agency’s construction procurement certification level, shall require an inspection by the Office of State Engineer (OSE) and the State Engineer’s issuance of a Certificate of Occupancy. (The Contractor may find Agency construction certification limits on Procurement Services website at http://procurement.sc.gov/PS/agency/PS-agency-audits.phtm.) Final payment will not be due nor retained funds released until (1) the Agency agrees that the project is complete, (2) OSE or the Agency, which ever has authority, issues a Certificate of Occupancy, and (3) the Agency receives from the Contractor the following:
   a. Affidavit of payment of debts and claims;
   b. Consent of Surety, if any, to final payment.

5. DISPUTES

5.1 Both parties shall attempt to resolve disputes through good faith negotiations.

5.2 All disputes, claims, or controversies relating to the Contract, that cannot be resolved through good faith negotiations between the parties 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 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 States Constitution. As used herein, “the State” includes the Agency and the State Fiscal Accountability Authority.

5.3 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 Agency 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.

5.4 Contractor consents that any papers, notices, or process necessary or proper for the initiation or continuation of any 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 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.

5.5 Continuation of Work: Pending final resolution of any dispute under this Contract, the Contractor will proceed diligently with the performance of its duties and obligations under the Contract Documents, and the Agency will continue to make payments of undisputed amounts in accordance with the Contract Documents.

6. LIMITATION OF LIABILITY

6.1 Notwithstanding any other provision of the Contract Documents, but subject to a duty of good faith and fair dealing, the Contractor and Agency waive Claims against each other for listed damages arising out of or relating to this Contract. This mutual waiver includes
6.1.1 For the Agency, 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) reasonable attorney’s fees, (vii) any interest, except to the extent allowed by Part 5.3 (Interest), (viii) lost revenue and profit for lost use of the property, (ix) costs resulting from lost productivity or efficiency, and (x) damages incurred by the Agency for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

6.1.2 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) reasonable attorney’s fees, (vi) any interest, except to the extent allowed by Part 5.3 (Interest); (vii) unamortized equipment costs; and (viii) losses incurred by subcontractors for the types of damages the Contractor has waived as against the Agency.

6.2 This mutual waiver is applicable, without limitation, to all listed damages due to either party’s termination in accordance with Part 9. Nothing contained in this Part 6 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 Part 3.17 (Indemnification).

7. Hazardous Materials

7.1 Contractor’s Responsibilities With Respect to Hazardous Materials: The scope of Work the Contractor is to perform pursuant to this Contract excludes any work or service of any nature associated or connected with the discovery, identification, abatement, cleanup, control, or removal of any currently existing Hazardous Materials or Mold on, in, or nearby the site of the Work. When requesting cost proposals, the Agency will identify known Hazardous Materials or Mold on, in, or nearby the site of the Work. The Agency agrees that all duties and obligations in connection with any Hazardous Materials or Mold currently located in, on or nearby the Site or brought into the Site by a party other than the Contractor or its subcontractors, other than those defined in the Delivery Order for the Work affected by the Hazardous Material or Mold, are not the Contractor’s responsibility. Should the Contractor become aware, discover or based on reasonable evidence suspect the presence of Hazardous Materials or Mold beyond those addressed in the Delivery Order for the Work affected by the Hazardous Material or Mold, the Contractor will immediately cease work in the affected area, and will promptly notify the Agency of the conditions discovered. Should the Contractor stop work because of such discovery or suspicion of Hazardous Materials or Mold, then the Contract Time will, should the Agency elect to choose to continue the Work after remedy thereof, be reasonably extended by Change Order to cover the period required for abatement, cleanup, or removal of the Hazardous Materials or Mold. The Contractor will not be held responsible for any claims, damages, costs, or expenses of any kind associated with such period during which work has been stopped as a result of Hazardous Materials or Mold.

7.2 Hazardous Materials Introduced to the Site by Contractor: If the Contractor, its subcontractors, and any party for whom they may be liable, introduces any Hazardous Materials to the Site then the Contractor, at its sole cost and expense, shall be responsible for any response, removal, cleanup, and/or other remedial action required by applicable law. If any Mold occurs within the Site as the result of the negligent implementation of the Project or the improper functioning of the Conservation Measures, then the Contractor, at its sole cost and expense, shall be responsible for any response, removal, cleanup, or other remedial action required by applicable law. Except as to the Contractor’s initial response to an emergency, any such remedial action(s) shall require the prior review and approval of the Agency.

8. MISCELLANEOUS PROVISIONS

8.1 Governing Law: This Contract shall be governed by the laws of South Carolina, except its choice of law rules.

8.2 Severability: If any provision of this Contract shall be held to be invalid, illegal, or unenforceable, the validity, legality and enforceability of the remaining provisions shall not be affected or impaired thereby.

8.3 No Waiver: No course of dealing or failure of the Agency and/or the Contractor to enforce strictly any term, right or condition of this Contract shall be construed as a waiver of such term, right or condition. No express waiver of any term, right, or condition of this Contract shall operate as a waiver of any other term, right, or condition.

8.4 Rights Cumulative: Except as otherwise provided in this Contract, (i) rights and remedies available to the Agency and/or the Contractor as set forth in this Contract shall be cumulative with and in addition to, and not in limitation of, any other rights or remedies available to the Parties at law and/or in equity, and (ii) any specific right or remedy conferred upon or reserved to the Agency and/or the Contractor in any provision of this Contract shall not preclude the concurrent or consecutive exercise of a right or remedy provided for in any other provision hereof.
8.5 Notices: Any notices required to be given under this Contract shall be in writing and shall be delivered either by (i) certified mail, return receipt requested, in which case notice shall be deemed delivered three (3) business days after deposit, postage prepaid, in the U.S. mail; (ii) a reputable messenger service or a nationally recognized overnight courier, in which case notice shall be deemed delivered one (1) business day after deposit with such messenger or courier; or (iii) personal delivery with receipt acknowledged in writing, in which case notice shall be deemed delivered when received. All notices shall be sent to the representatives identified in the Part G of the Agreement at the addresses provided therein. The foregoing addresses may be changed from time to time by notice to the other Party in the manner herein provided for.

8.6 Economic Conflict of Interest: A Contractor shall not have or exercise any official responsibility regarding a public contract in which the Contractor, or a business with which he is associated, has an economic interest. A person working for Contractor shall not have or exercise any official responsibility regarding a public contract in which the person, an individual with whom he is associated, or his family members have an economic interest. If Contractor is asked by any person to violate, or does violate, either of these restrictions, Contractor shall immediately communicate such information to the Agency Representative. The State may rescind, and recover any amount expended as a result of, any action taken or contract entered in violation of this provision. The terms "business with which he is associated," "economic interest," "family member," "immediate family," "individual with whom he is associated," "official responsibility" and "person" have the meanings provided in S.C. Code Ann. § 8-13-100.

8.7 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)

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

8.9 False Claims: According to the S.C. Code Ann. § 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.

8.10 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)

8.11 Enforcement and 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 Agency and OSE for resolution. When the amount of a Delivery Order exceeds the construction procurement certification of the Agency, the Contractor shall not commence the Work of the Delivery Order before receiving a copy of the Building permit issued by OSE. (The Contractor may find Agency construction certification limits on Procurement Services website at http://procurement.sc.gov/PS/agency/PS-agency-audits.phtm.)

8.12 Assignment: The Agency and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements and obligations contained in this Contract. 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.
9. SUSPENSION OR TERMINATION

9.1 Agency Right of Suspension: The Agency may, at any time, suspend the work, in whole or in part, with or without cause for such period of time as determined by the Agency. Except in the event of suspension due to a default of the Contractor, the contract sum will be equitably adjusted to reflect reasonable costs actually incurred by the Contractor due to delay or interruption resulting from such suspension.

9.2 Agency Right of Termination:

9.2.1 Termination for Cause: If the Contractor defaults, persistently fails or neglects to perform the Work in accordance with the Contract Documents, or fails to perform a provision of the Contract, the Agency shall provide written notice of such default, failure, or neglect to the Contractor. If the Contractor fails to cure such default, failure, or neglect within fifteen days from receipt of the Agency’s notice, the Agency may, without prejudice to any other right or remedy the Agency may have, terminate the Contract and take possession of the area at the Site affected by the Work.

9.2.2 Termination for Convenience: The Agency may, for its convenience, terminate all or any portion of the Work under an individual Delivery Order, or terminate this entire Contract, by ten (10) days written notice stating the effective date of the termination. Thereafter, the Agency shall pay the Contractor for Work actually performed before the date of termination. No payments shall be made for Work not actually performed, and no payment shall be made or due for lost profits on account of Work not performed.

9.3 Contractor Right of Termination:

9.3.1 The Contractor may terminate the contract, or Delivery Order, if work is stopped through no fault of the Contractor, or other persons performing work either directly or indirectly for the Contractor, for a period of time exceeding 60 consecutive calendar days due to a court order or other public authority having jurisdiction; or a Declared National emergency which requires the work to be stopped.

9.3.2 Agency Failure to Make Payment: Subject to the Agency’s right to withhold payments pursuant to Part 3.4.7, if the Agency fails to make payments to the Contractor as set forth in Part 10 and any other applicable provisions of the Contract Documents, the Contractor may, upon thirty (30) days’ prior written notice to the Agency, terminate the Contract and recover from the Agency payment for all Work performed and for proven loss with respect to materials, equipment, tools, and machinery, including reasonable overhead, profit and damages applicable to the Work for the Contract Services performed through the date thereof.
CONSTRUCTION SERVICES IDC DELIVERY ORDER

AGENCY: Medical University of South Carolina

DELIVERY ORDER PROJECT NAME: 

DELIVERY ORDER PROJECT NUMBER: 

STATE IDC PROJECT NUMBER: H51-D159

AGENCY IDC CONTRACT NO.: AGENCY DELIVERY ORDER NO.: 

CONTRACTOR: 

ADDRESS: 

COST INFORMATION:

1. Maximum Total Amount of this IDC: $ 1,000,000.00 
2. Maximum Total Amount Allowed for Delivery Order: $ 250,000.00 
3. Amount of this Delivery Order: 
4. Total Amount of Previous Delivery Orders (including Modifications): 
5. IDC Total, Including this Delivery Order: 
6. Balance Remaining for this IDC: 

DELIVERY ORDER CONTRACT

$ 0.00 $ 0.00

SCHEDULE:

1. Date of Commencement: 
2. Days Allowed 
3. Date of Substantial Completion: 

Description of Delivery Order Scope of Work: (attach Contractor’s Proposal)

List of Delivery Order Documents: (refer to attachments as necessary)

PROPERTY INSURANCE: (check box for applicable provision)

☐ Contractor shall provide property insurance as provided in Part 3.18.2 of the General Conditions, SE-685.

☐ Contractor is not required to provide property insurance as provided in Part 3.18.2 of the General Conditions, SE-685. Agency will provide property insurance covering only the Agency’s interest in the work of this Delivery Order as follows: 

☐ Contractor is not required to provide property insurance as provided in Part 3.18.2 of the General Conditions, SE-685, but shall provide insurance as follows: 

☐ The work of this Delivery Order does not require property insurance and Contractor is not required to provide property insurance as provided in Part 3.18.2 of the General Conditions, SE-685.

The Agency and the Contractor hereby agree, as indicated by the signatures below, to the scope of work identified in the Contract Documents listed above, the Contractor’s Cost Proposal dated the ____ day of ____, 20____, and this Delivery Order which shall be assigned to the Indefinite Delivery Contract identified above.

NOTICE TO PROCEED is hereby given on this the ____ day of ____, 20____. The Dates of Commencement and Substantial Completion are as noted above and shall be used for determining completion and the applicability of Liquidated Damages. Liquidated Damages in the amount of $ ____ per day will be assessed for failure to complete the Work by the agreed upon date of completion. Failure to commence actual work on this Delivery Order within seven (7) days from the Date of Commencement will entitle the Agency to consider the Contractor non-responsible, and may withdraw this Delivery Order and terminate the Contract in accordance with the Contract Documents.

AGENCY: 

BY: 

(Signature of Representative)

Print Name: 

Print Title: 

Date: 

CONTRACTOR 

BY: 

(Signature of Representative)

Print Name: 

Print Title: 

Date: 

COMPLETION CERTIFICATION BY AGENCY:

ACTUAL COMPLETION DATE: 

LIQUIDATED DAMAGES ASSESSED: 

CERTIFIED BY (Signature of Agency Representative): 

TITLE: 

DATE: 

SE-690
CONSTRUCTION SERVICES IDC DELIVERY ORDER MODIFICATION

AGENCY: Medical University of South Carolina

DELIVERY ORDER PROJECT NAME: ____________________________

DELIVERY ORDER PROJECT NUMBER: _______________________

STATE IDC PROJECT NUMBER: H51-D159

AGENCY IDC CONTRACT NO.: ___________________________

AGENCY DELIVERY ORDER NO.: ___________________________

DELIVERY ORDER MODIFICATION NUMBER: __________________

CONTRACTOR: ____________________________

ADDRESS: ____________________________

COST INFORMATION:

1. Maximum Total Amount of this IDC: ____________________________
2. Maximum Total Amount Allowed for Delivery Order: ____________________________
3. Current Amount of this Delivery Order: ____________________________
4. Amount of this Modification: ____________________________
5. Adjusted Amount of this Delivery Order: ____________________________
6. IDC Total (Sum of all Delivery Orders, including this DO) Prior to this Modification: $250,000.00
7. IDC Total (Sum of all Delivery Orders) Including this Modification: ____________________________
8. Balance Remaining for this IDC: $1,000,000.00

DELIVERY ORDER CONTRACT

SCHEDULE:

1. Date of Commencement: ____________________________
2. Previous Days Allowed: ____________________________
3. Additional Days Allowed this Modification: ____________________________
4. Revised Date of Completion: ____________________________

Description of Delivery Order Scope Modification: (attach Contractor’s Proposal) ____________________________

List of Modification Documents: (refer to attachments as necessary) ____________________________

The Agency and the Contractor hereby agree, as indicated by the signatures below, to the revised scope of work identified in the Modification Documents listed above, the Contractor’s Cost Proposal dated the ___ day of ___, 20___, and this Delivery Order Modification, which shall be assigned to the Indefinite Delivery Contract identified above.

AGENCY: ____________________________

BY: ____________________________

(Signature of Representative)

Print Name: ____________________________

Print Title: ____________________________

Date: ____________________________

CONTRACTOR: ____________________________

BY: ____________________________

(Signature of Representative)

Print Name: ____________________________

Print Title: ____________________________

Date: ____________________________
PROGRAM OBJECTIVES

1. MUSC/MUHA has adopted the following objectives:
   
   A. To provide maximum practical opportunities for Minority and Women's Business Enterprises (MWBEs) to participate as suppliers and contractors for our organization.
   
   B. To support the economic development of both small business enterprises and the minority community.
   
   C. To provide Minorities and Women equal opportunities for participation in Capital Projects construction (additions, renovations and new construction), procurement, professional services, and system-wide purchasing contracts.
   
   D. To provide procedures that will enable MUSC/MUHA to fulfill the goals of the State that are related to equal employment opportunities and affirmative actions in its construction contracts.
   
   E. To provide procedures for determining and monitoring MWBE participation and compliance with MWBE requirements stated in the contract documents. Also, to provide procedures for the solution of complaints concerning discrimination against any businesses holding contracts with the MUSC/MUHA.
   
   F. To evaluate and report to the MWBE Small and Minority Business Advocate and to MUSC/MUHA the results of contract activity, subject to the provisions of the MWBE Program.

2. In order to accomplish the objectives of the MWBE Program, the following specific goals have been established:
   
   A. To increase buying activities with Minority and Women's Enterprises that have the capability of providing construction services necessary for MUSC/MUHA operations.
   
   B. To actively and diligently seek out Minority and Women's Enterprises who have the potential of becoming a source of construction services.
   
   C. To promote awareness of the MWBE Program throughout MUSC/MUHA and the Community.
   
   D. To assist in the development of Minority and Women's Business Enterprise to insure that maximum opportunities are given to actively compete for construction opportunities with MUSC/MUHA.
SECTION I

GUIDELINES FOR M/WBE PARTICIPATION IN CONSTRUCTION SERVICES

CONSTRUCTION

These guidelines are established to accomplish the goal of providing for minority participation in Single and Multi-Prime capital construction contracts. The Medical University of South Carolina shall have a verifiable percentage goal of participation by Minority and Women’s businesses in the total value of work for each project for which a contract is awarded. These guidelines are published to accomplish that end.

ITEM 1:

INTENT

It is the intent of these guidelines that the Medical University of South Carolina and the contractors and subcontractors performing construction contracts for the Medical University of South Carolina shall cooperate, and in good faith, do all things legal, proper and reasonable to achieve the verifiable goal of 12% for participation by Minority and Women’s businesses in each construction project. Nothing contained in these guidelines shall be considered to require awarding authorities to award contracts or to make purchases of materials or equipment from M/WBE contractors who do not submit the lowest responsive responsible bid or bids.

ITEM 2:

DEFINITIONS

1. **Affirmative Action** - A plan, or specific measurable steps, taken by an agency, business or individuals to fully involve Minority Business Enterprises and Women’s Business Enterprises in contracts and programs and to assure non-discrimination and equal opportunities in the performance of work, contracts, or any elements of a project administered by MUSC/MUHA Minority/Women’s Business Enterprise Program.

2. **Bidder/Participant/Offeror** - Any person, firm, partnership, corporation, association, or joint venture seeking to be awarded a public contract or subcontract.

3. **Contract** - A mutually-binding legal document which defines a business relationship or any modification at the level of performance which obligates the seller to furnish supplies, equipment, materials or services, knowledge in performing construction and procurements, and obligating the buyer to pay for services.

4. **Contractor** - Any person, firm, partnership, corporation, association, or joint venture that has been awarded a contract purchase or service agreement at any level with MUSC/MUHA or that has contracted with the Owner to perform construction work or repair.

5. **Discrimination** - Any action that distinguishes, differentiates, separates, or segregates one person or group from another, solely on the basis of age, race, religion, color, sex, national origin, handicap or veteran’s status.

6. **Goal** - An objective, expressed numerically to evaluate the type and amount of contract awards and performance of Minority- and Women-owned business enterprises.

7. **Good-Faith Effort** - All activity performed by bidders to encourage the participation of minority and women’s enterprises (M/WBE) in contracts covered under this plan.

8. **Joint Venture** - A legal merger of two or more businesses (separately-owned firms) for the purpose of submitting a single bid, to carry out a single business enterprise for profit, for which purpose they combine their property, capital, efforts, skills or knowledge.

9. **MUSC** - Medical University of South Carolina

MUSC/MUHA

Rev. 10/14/08
10. **MUHA – Medical University Hospital Authority**

11. **Minority (MBE)** - a person who is a citizen or lawful permanent resident of the United States and who is:
   (a) **African-American**, that is, a person having origins in any of the original racial groups in Africa;
   (b) **Hispanic**, that is, a person of Spanish or Portuguese culture with origins in Mexico, South or Central America, or the Caribbean Islands, regardless of race;
   (c) **Native-American**, that is, a person having origins in any of the original peoples of North America; or
   (d) **Asian-American**, that is, persons having origin in any of the countries of the Far East, Southeast Asia, or the Indian areas.

12. **Minority or Women's Business Enterprises-MWBE** - a business enterprise owned and controlled at a minimum of 51% by one or more members of a group defined as a minority or as women. A business certified as a minority- or woman-owned enterprise will show evidence of ownership and management interests and the daily business operations are real and continuing, not created solely to meet the MWBE requirements.

13. **Owner** – Medical University of South Carolina/Medical University Hospital Authority

14. **Owned and Controlled** - A business which is (1) a sole proprietorship legitimately owned by an individual who is a member of a minority and/or female, (2) a partnership or joint venture controlled by minorities and/or females, and in which at least 51% of the beneficial ownership interests legitimately are held by minorities and/or females, or (3) a corporation or other entity controlled by minorities and/or females, and in which at least 51% of the voting interests are legitimately held by minorities and/or females. In addition, these persons must control the management and operation of the business on a day-to-day basis.

15. **Subcontractor** - A firm under contract with the prime contractor for supplying materials or labor and materials and/or installations. The subcontractor may or may not provide materials in his subcontract. Work subcontracted in an emergency and which could not have been anticipated is excluded as a part of this program.

16. **Verifiable Goal** – For purposes of the Single-Prime contracts, the advertising authority has adopted written guidelines specifying the actions that the prime contractor should consider taking to ensure a good-faith effort in the recruitment and selection of minority and women’s businesses for participation in contracts awarded; the required actions must be documented in writing by the contractor to the appropriate awarding authority.

**PART 3:**

**RESPONSIBILITIES**

1. **Medical University of South Carolina/Medical University Hospital Authority - Owner**

   MUSC/MUHA under the Single and Multi Prime contract system will be responsible for the following:

   (a) For contracts in excess of $500,000 estimated cost, notify Minority and Women’s Business firms within twenty-one (21) days prior to the bid opening through means of advertising in the South Carolina Business Opportunities of the opportunities. Advertisements will include:
   1. Project description and location;
   2. Locations where bidding documents may be reviewed;
   3. Name of a representative of the Owner who can be contacted during the advertising period to advise who the prospective bidders are;
   4. Date, time and location of the bid opening.
   5. Date, time and location of pre-bid conference, if scheduled. The twenty-one day advance time period may be reduced to ten days for contracts in the range of $100,000 to $500,000 in the estimated cost.

   (b) The pre-bid conference, if scheduled, is conducted by the representative of the Owner, and will be open to all known and anticipated prime contractors, subcontractors, material suppliers, and other bidders.
2. **Prime Contractor, Bidder or Offeror**

Prime Contractors under the Single and Multi-Prime contract system will be responsible for the following:

(a) Attend the scheduled mandatory pre-bid conference.
(b) Identify or determine those work areas of a subcontract where M/WBEs may have an interest in performing subcontract work.
(c) Submit, with the first application for payment, a description of the portion of the work to be executed by M/WBEs expressed as a percentage of the total contract price.
(d) If the Contractor elects to use a M/WBE firm that is not certified by the Governor’s Office of Small and Minority Business Assistance (OSMBA) the Contractor shall encourage the subcontractor to submit an application for certification within thirty (30) days of signing the Letter of Intent (Appendix II). If the firm does not submit an application within the specified time frame or fails to meet the certification criteria, the contract amount with that M/WBE firm will not be considered as M/WBE participation.
(e) Upon being named the apparent low bidder, the Bidder shall submit to the Project Manager their good faith backup documentation if they have not met their M/WBE goal.
(f) If, during the construction of a project, additional subcontracting opportunities become available, the prime or general contractors must make good-faith efforts to solicit sub-bids from M/WBEs.

3. **M/WBE Responsibilities**

M/WBE firms do not have to be certified to be listed on the bid documents; however, M/WBE firms that have been awarded contracts will not be credited towards MUSC/MUHA’s M/WBE Program unless they are certified with the Governor’s Office of Small and Minority Business Assistance (OSMBA).

(a) M/WBEs should make every effort to establish contacts and relationships with contractors for potential future business, including attending pre-bid conferences and subscribing to industry and trade journals.
(b) In addition, M/WBEs who are contacted by Owners or Bidders should respond promptly whether or not they wish to submit a bid. If an M/WBE firm is listed as a subcontractor or supplier, they will be responsible for completing a Letter of Intent (Appendix II) in a timely manner and returning it to the Prime Contractor.
(c) M/WBE who are not certified at the time the firm commits to provide services, should apply for certification with the Governor’s Office of Small and Minority Business Assistance (CSMBA) within thirty (30) days. If the M/WBE firm fails to submit an application within the specified time frame or if the M/WBE firm is not granted certification by the Certification Committee, that M/WBE firm’s contract dollars will not be counted as M/WBE participation.
SECTION II

M/WBE CONTRACT PROVISIONS

ITEM 1: PROVISIONS FOR CONSTRUCTION

A. APPLICATION:

The requirements of the MUSC/MUHA Minority and Women's Business Enterprise (M/WBE) Provisions and Guidelines are hereby made a part of these contract documents. The requirements shall apply to all contractors regardless of ownership. Copies of the M/WBE Program may be obtained from the M/WBE Administrator, Engineering and Facilities, 97 Jonathan Lucas Street, P.O. Box 250190, Charleston, SC 29425.

B. M/WBE SUBCONTRACT GOALS:

The goals for participation by M/WBE as subcontractors on this project have been set at 12%.

The Bidder shall provide documented proof, with the first application for payment, in the form of Appendix I, M/WBE Utilization Commitment Form the percentage of M/WBE participation. Submit signed copies of Appendix II - Letters Of Intent to Perform as a Subcontractor, to the Project Manager.

C. COMPLIANCE DOCUMENTATION:

If the M/WBE subcontract goals are not achieved, the Bidder shall provide the following documentation to the Project Manager with the first application for payment:

1. M/WBE Utilization Commitment (Appendix I)

2. With the first pay application, the Bidder shall provide to the Project Manager signed Letters of Intent to Perform as a Subcontractor (Appendix II) for the M/WBE subcontractors listed on Appendix I.

3. After review of the Bidder's Good Faith Efforts, the Bidder may request and be granted a Waiver of the M/WBE goals that have not been met for that particular project. A Waiver may be granted upon review of the Bidder's documentation and determination that, in fact, a Good Faith Effort has been put forth.

NOTE: If the Bidder provides sufficient evidence on the M/WBE Utilization Commitment (Appendix I) that the goals have been met, or awards all subcontracts to M/WBEs, the Good Faith Efforts Documentation as listed above in #3 may not be required.
APPENDIX I
M/WBE UTILIZATION COMMITMENT FORM
FOR CONSTRUCTION

We, ________________________________________________, do certify that on the _______________, (Project Name)
____________________________________________________ we will expend a minimum of ___ %
(Bidder) __________________________________________ (Project Number)
(Dollar Amount of Bid) __________________________________________

of the total dollar amount of the contract with Minority/Women Business Enterprises. M/WBEs will be employed as construction
subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms
listed below.

If the bidder intends to subcontract, this form must be completed regardless of the amount of M/WBE participation attained.

<table>
<thead>
<tr>
<th>NAME OF FIRM</th>
<th>PHONE NUMBER</th>
<th>MBE OR WBE</th>
<th>Description of Work</th>
<th>Dollar Value</th>
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The undersigned will enter into a formal agreement with Minority/Women’s Firms for work listed in this schedule conditional upon
execution of a contract with the MUSC/MUHA.

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

Date: ____________________

(Name & Phone No. of Authorized Officer)

Signature: ____________________________

Title: ____________________________

APPENDIX I OR APPENDIX II MUST BE SUBMITTED WITH THE FIRST APPLICATION FOR PAYMENT
APPENDIX II
LETTER OF INTENT
TO
PERFORM AS A
SUBCONTRACTOR OR SUBCONSULTANT
(PROVIDE MATERIALS OR/ & SERVICES)

PROJECT: ______________________________________________________________________

(Project Name)

TO: ___________________________________________________________________________

(Name of Prime Bidder)

The undersigned intends to perform work in connection with the above project as

____ Minority Business Enterprise
____ Women’s Business Enterprise

____ The MWBE status of the undersigned is certified by the Governor’s Office of Small and Minority Business Assistance. Our MWBE certification number is ____________________________.

____ The MWBE status of the undersigned is not certified by the Governor’s Office of Small and Minority Business Assistance. Our application was submitted on ____________________________.

The undersigned is prepared to perform the following described work or provide materials or services in connection with the above project (specify in detail particular work items, materials or services to be performed or provided) at the following price:

________________________________________________________________________

You have projected the following commencement date for such work, and the undersigned is projecting completion of such work as follows:

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<th>Items</th>
<th>Projected Commencement Date</th>
<th>Projected Completion Date</th>
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Subcontracting at any tier must be reported and is subject to all MWBE compliance requirements. This form shall be used for MWBE subcontracting at any level.

Date: __________________________

(Name & Phone No. of MWBE Company)

________________________________________

(Name & Title of Authorized Office)

________________________________________

(Signature)

THE PRIME CONTRACTOR MUST GET THIS FORM COMPLETED BY THE MWBE SUBCONTRACTORS

MUSC/MUHA

Rev. 10/14/08
APPENDIX III
MWBE DOCUMENTATION OF CONTRACT PAYMENTS FORM

Prime Contractor: ________________________________________________________________

Address & Phone: __________________________________________________________________

Project Name: ____________________________________________________________________

Pay Application #: ___________________________  Period: ______________________________

The following is a list of payments made to Minority and Women Business Enterprises certified by the Governor’s Office of Small and Minority Business Assistance on this project for the above mentioned period.

<table>
<thead>
<tr>
<th>MWBE FIRM NAME</th>
<th>INDICATE MBE OR WBE</th>
<th>OSMBIA CERTIFICATION</th>
<th>AMOUNT TO BE PAID THIS PERIOD</th>
<th>TOTAL PAYMENTS TO DATE</th>
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Date: __________________________

Name of Authorized Officer

______________________________
Signature

______________________________
Title

SUBMIT WITH EACH PAY REQUEST & FINAL PAYMENT
HUMAN RESOURCES MANAGEMENT POLICY

TOBACCO-FREE CAMPUS

Policy 49

NOTE: THE LANGUAGE USED IN THIS DOCUMENT DOES NOT CREATE AN EMPLOYMENT CONTRACT BETWEEN THE EMPLOYEE AND THE MEDICAL UNIVERSITY OF SOUTH CAROLINA (MUSC). MUSC RESERVES THE RIGHT TO REVISE THE CONTENT OF THIS DOCUMENT, IN WHOLE OR IN PART. NO PROMISES OR ASSURANCES, WHETHER WRITTEN OR ORAL, WHICH ARE CONTRARY TO OR INCONSISTENT WITH THE TERMS OF THIS PARAGRAPH CREATE ANY CONTRACT OF EMPLOYMENT.

I. PURPOSE

MUSC is committed to promoting a healthy, tobacco-free environment for its employees, faculty, students, visitors and patients. The purpose of this policy is to provide a healthy environment, minimize the negative effects of passive smoke and tobacco use, maximize fire safety and promote wellness and good health habits within all MUSC facilities, including MUSC affiliates, and the surrounding campus.

II. POLICY

A. Covered Individuals

The provisions of this policy shall apply to all employees (including faculty and staff), patients, visitors, students, volunteers, contractors and vendors unless otherwise noted.

B. Use of Tobacco Products

1. The use of any tobacco product is prohibited in all buildings, grounds and spaces either leased or owned by the Medical University. The Human Resources Management Policy No. 49, Tobacco-Free Campus, includes, but is not limited to, offices, classrooms, laboratories, elevators, stairwells,
restrooms, shuttle buses, shuttle bus stops, sidewalks, parking areas, meeting rooms, hallways, lobbies, and other common areas.

2. The use of tobacco products in University owned, operated or leased vehicles is prohibited.

3. Use of tobacco products is also prohibited in personal vehicles parked on MUSC property.

4. The use of tobacco products is prohibited on all streets and sidewalks within the Medical District as defined by the City of Charleston ordinance (see Medical District map).

5. MUSC also prohibits the use of tobacco products by staff on private properties adjacent to the Medical District without explicit approval from the property owner. Individuals should refrain from smoking in areas where smoke is likely to enter private property through entrances, windows, ventilation systems or other means and are expected to respect requests to refrain from smoking in particular areas if asked to do so by agents or employees of the University. Tobacco use on public property neighboring MUSC is highly discouraged.

6. Use of tobacco products while representing MUSC, wearing MUSC scrubs or uniforms, wearing an MUSC badge, or on paid break is prohibited.

C. List of Tobacco Products

Tobacco products include, but are not limited to, cigarettes, cigars, pipes, chewing tobacco, e-cigarettes and other smokeless tobacco products.

III. INFORMATION AND PROCEDURE

A. Faculty/Staff/Volunteers

1. Faculty, staff and volunteers are expected to comply with the Tobacco-Free Campus Policy and assist with sharing information about the policy.

2. New employees and volunteers will be informed of the Tobacco-Free Campus Policy during orientation.

3. Enforcement of the policy rests with the appropriate supervisory staff, deans, department heads and administrative officials.

4. When employees or volunteers observe violations of the policy, they should politely remind the offender of the policy and request that they dispose of tobacco materials.

5. If the employee or volunteer continues to violate the policy, the location and time of the violation should be reported to the appropriate supervisory staff, dean, department head or administrative official. Human Resources Employee Relations may also be contacted to report violations.
6. Violation patterns will be assessed and appropriate action initiated. Employees who are found to be in violation will be disciplined in accordance with the Human Resources Policy No. 45, Disciplinary Action. Action may range from written reprimand to termination. Refer to specific guidelines as outlined by MUSC, MUHA and UMA.

B. Patients

1. Faculty, staff and clinical staff with patient care responsibilities are responsible for communicating and ensuring compliance with the Tobacco-Free Campus Policy.

2. Upon admission/check-in, patients will be verbally informed of the policy and a copy will be provided upon request.

3. Patients violating MUSC’s policy will be asked to dispose of tobacco materials.

4. Tobacco replacement therapies, i.e. nicotine patch, nicotine gum, etc., may be prescribed by the patient’s physician.

C. Visitors

1. Visitors will be informed of the policy and asked to comply while they are on campus.

2. Signage will be posted throughout MUSC’s buildings and grounds; stating this facility is a tobacco-free campus.

3. All employees and volunteers are encouraged to assist with the education of visitors regarding the policy, using policy information cards, which will be made available.

4. Employees are expected to help enforce the policy with visitors by requesting that they dispose of tobacco materials and respect MUSC’s healthcare mission and tobacco-free campus.

5. If a visitor is observed repeatedly violating the policy after being advised of the policy, staff should note the location and time of the violation and contact their respective manager, Department of Public Safety or Medical Center Safety and Security, or Human Resources.

D. Students

1. New students will be informed of the Tobacco-Free Campus Policy during orientation.

2. Enforcement of the policy rests with the respective Dean’s office.
3. When students observe violations of the policy, they should remind their fellow students of the policy and ask them to dispose of the tobacco materials.

4. If the student continues to violate the policy, the location and time of the violation should be reported to the appropriate Dean's office.

5. Violation patterns will be assessed and appropriate action initiated.

6. Affiliation agreements will include the Tobacco-Free Campus Policy so that students from other schools will be advised of the policy.

E. Contractors/Vendors

1. A provision will be inserted in all contracts, e.g. construction and/or maintenance, to prohibit the employees of contractors/vendors from using tobacco materials on property owned or leased by MUSC. Contractors and vendors are expected to ensure full compliance at all times with this policy by any employees and/or subcontractors providing services on MUSC property.

2. Failure by the contractor/vendor or their employees to comply with the provisions of this policy could result in contractors/vendors (or their employee(s) violating this policy) being asked to leave campus and/or the termination of the service contract with the contractor or vendor.

IV. ENFORCEMENT

A. The monitoring and enforcement of this policy is the responsibility of ALL MUSC/MUHA/UMA employees, students and volunteers. Each individual should consistently and politely bring any infraction of this policy to the attention of the person or persons observed violating the policy.

B. The MUSC Department of Public Safety and Medical Center Safety and Security will assist in the enforcement of this policy by reporting violations to the appropriate manager or supervisor. Employees are also expected to assume leadership roles by adhering to the policy provisions and by reminding others who aren’t in compliance of the policy provisions.

C. MUSC will provide Tobacco-Free Campus Policy information cards to facilitate the education and enforcement of the policy.

V. RESOURCES

MUSC will offer resources and support to tobacco users in abstaining from tobacco use on campus and in supporting users who desire to quit using tobacco. Smoking cessation
classes and other tobacco education related resources or programs will be offered periodically for MUSC employees. Many of these programs are offered at little to no cost. Additional resources are outlined on the Tobacco-Free Campus website.

VI. EXCEPTIONS

Individuals enrolled in smoking research and/or treatment programs are permitted to smoke in designated smoking areas that are physically separated from care, treatment and service areas upon approval. If the Medical Center decides that patients may smoke in specific circumstances, it will designate smoking areas that are physically separated from care, treatment and service areas.

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<th>Approved by:</th>
<th>Information Contact</th>
<th>Approved</th>
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<tr>
<td>Lisa P. Montgomery</td>
<td>Director of Human Resources Management</td>
<td>Effective March 1, 2012</td>
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<tr>
<td>Vice President for Finance &amp; Administration</td>
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<td>Revised June 2013</td>
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Summary of Work

SECTION 01 10 00

SUMMARY OF WORK

PART 1 GENERAL

1.01 SCOPE

BASE BID

A. The overall scope of this project is to install two owner provided CRAC units at the Psychiatric Institute Data Center on the MUSC Charleston Campus. This project is the installation of 2-20 ton CRAC units and connection to the chilled water piping system. Work includes new chilled water piping, connection to existing chilled water piping, valves, controls and electrical work. The 2-20 ton CRAC units have been purchased by the owner and will be installed by the contractor. The contractor is responsible for transporting the CRAC units from the MUSC Arco Lane warehouse to the construction site and is responsible for rigging, transporting and installing. A more detailed, but not exhaustive nor all inclusive list of scope requirements are shown below. The contractor shall review drawings and specifications carefully to determine the complete scope of the project and not depend solely on the description below. The following list is meant to serve as a general description of the project.

B. Removal, demolition, and replacement of chilled water piping, refrigerant piping, condensers, condensate piping etc. required for the replacement of mechanical and electrical components, piping, control panels, valves, actuators, electrical equipment, conduits, etc.

C. Electrical power and controls power for the new mechanical systems.

D. Removal, demolition, replacement, and installation of new electrical equipment, components, conduits, devices, starters, disconnects, and systems to serve all of the new mechanical equipment, systems and controls.

E. Dust tight construction partitioning and negative pressure exhaust systems to prevent dust migration to occupied spaces outside the construction zones.

F. Insulation of all new piping systems and valves included in this contract.

G. Vibration and seismic restraints for all new equipment, devices, piping installed under this contract.

H. Provide painting and labeling of all new piping and valves in the facility to show the contents and direction of flow for all piping. Color for each type of piping is to be approved by Engineer.

I. Provide removal of portion of the existing building systems to accommodate system modifications.

J. Modifications to the existing chilled water systems.
K. Installation of 2-20 ton CRAC units in the data center at the Psychiatric Institute, piping, valves, electrical etc. to make the units operational.

L. Provide appropriate personnel, equipment, chemicals, and procedures to flush and treat the water system to remove debris and substances that could impair the performance of the heat transfer surfaces. Water samples shall be taken and analyzed by a chemical treatment company approved by the Engineer and witnessed by a representative from the Engineer’s office. The system is to be certified as ready for use prior to any equipment being placed into service.

M. Start, test, adjust, balance and place into operation all systems. The building water and air distribution systems are to be balanced to provide the quantity of air and water as shown on drawings. System balance is to be accompanied with certified test forms as to obtained air and water quantities.

N. Provide a complete control system for the new mechanical/electrical equipment by unit manufacturer. The communications protocol shall be compatible with the existing campus wide Johnson Controls. Johnson Controls shall provide all controls. Contractor shall coordinate all control, interlock and starting circuit wiring. Controls wiring shall be 120 volts or less. Provide transformers and relays as required to comply with this requirement. Conduit shall be steel conforming to the requirements of the Electrical Specifications, except as otherwise specified.

ALTERNATE NO. 1

A. Installation of 2 remote condensing units and associated piping, mechanical, electrical, etc. for the 2-20 ton CRAC units. The 2 remote condensing units have been purchased by the owner and will be installed by the contractor. The contractor is responsible for transporting the condensing units from the MUSC Arco Lane warehouse to the construction site and is responsible for rigging, transporting and installing. A more detailed, but not exhaustive nor all inclusive list of scope requirements are shown below. The contractor shall review drawings and specifications carefully to determine the complete scope of the project and not depend solely on the description below. The following list is meant to serve as a general description of the project.

B. Removal, demolition, and replacement of refrigerant piping, condensers as required for the replacement of mechanical and electrical components, piping, control panels, valves, actuators, electrical equipment, conduits, etc.

C. Electrical power and controls power for the new mechanical systems.

D. Removal, demolition, replacement, and installation of new electrical equipment, components, conduits, devices, starters, disconnects, and systems to serve all of the new mechanical equipment, systems and controls.

E. Insulation of all new piping systems and valves included in this contract.

F. Vibration and seismic restraints for all new equipment, devices, piping installed under this contract.
G. Provide painting and labeling of all new piping and valves in the facility to show the contents and direction of flow for all piping. Color for each type of piping is to be approved by Engineer.

H. Provide removal of portion of the existing building systems to accommodate system modifications.

I. Installation of 2 remote condensing units on the roof of the Psychiatric Institute, piping, valves, electrical etc. to make the units operational.

1.02 TIME OF COMPLETION AND LIQUIDATED DAMAGES

A. Time of completion: Unless an extension of time is granted, all work under this contract shall be substantially complete within 120 consecutive days from “Notice to Proceed”.

B. Liquidated Damages: Should the Contractor fail to substantially complete the work under this contract within the stipulated days plus any additional days that may result from extensions of time granted by the Owner, he agrees that the Owner may retain the sum of $250.00 per each calendar day, the actual construction time required to achieve Substantial Completion exceeds the specified or adjusted time for Substantial Completion. This amount is agreed upon as a reasonable and proper measure of Liquidated Damages, which the Owner sustains per day by failure of the Contractor to complete the work within the time stipulated. This sum is not to be construed in any sense as a penalty.

1.03 MANNER OF CONDUCT OF THE WORK

A. The existing building will be occupied during the “life of the contract”. The work shall be done and temporary facilities provided so that daily operations and essential services are not interrupted.

B. Noisy operations, such as drilling, hammering, etc. shall be restricted by the Owner to avoid disruption of daily activities. The Schedule of Operations shall be approved by the Owner.

C. No work shall be undertaken and no service shall be interrupted unless prior approval is received from the Owner at least ten (10) working days prior to the interruption. Every request from the Contractor to begin work in a new area or on another floor level or to interrupt any service or function must be made to the Owner sufficiently far in advance to allow review (at least five working days), approval and concurrence by the Owner’s Administrative Staff. All notifications to Owner and Engineer shall be in writing.

D. No jack-hammering will be allowed unless written permission is received from the Owner.

E. All holes will be core drilled using a diamond core drill.

F. The Contractor has sole responsibility for enforcing coordination requirements to prevent interruptions and for adhering closely to the schedule.
1.04 SPECIAL SITE CONDITIONS

A. The work area is inside, on and beside the Psychiatric Institute Building which is in daily use by the staff and faculty. Bidders are specifically advised that storage and work space will be restricted. Encroachment beyond these limits by the Contractor shall be rigorously avoided. Material must be kept in a neat and orderly manner and work area must be kept clean.

B. Trash and debris must be removed by Contractor daily. No food or drink will be allowed inside the existing Building or any renovated areas.

C. Construction Parking: Parking at the building site will be restricted to one (1) parking space. Contractor will be responsible for workers travel to and from the project site from a remote parking site. Deliveries of equipment and materials will be via the building loading dock where applicable and shall be limited to loading and unloading only. NO UNATTENDED VEHICLES WILL BE ALLOWED. DRIVERS MUST REMAIN WITH THE VEHICLES.

1.05 ACCESS TO THE BUILDING AND STORAGE

A. The contractor will be permitted to bring workmen, material, equipment, etc., into the Psychiatric Institute through an entrance approved by MUSC.

B. Materials shall arrive on the site only as they are needed and immediately delivered to the limited construction area. Coordinate the construction site space needs with the Owner. Very limited space will be available outside the construction area.

C. Supplies, equipment and materials to be delivered to the construction area in closed containers sized to be conveniently transported through existing corridors and door openings.

D. The Contractor shall remove all waste material via the same route.

E. Remove all waste material from Owner’s property and legally dispose of it.

F. Debris, trash and unused materials shall be removed from the construction area and roof daily in closed containers which are sized to be conveniently transported through existing corridors and door openings.

1.06 WORK SCHEDULE

A. Working hours for this project will be 8:00 a.m. to 5:00 p.m. on weekdays. Nothing in the above work schedule shall void the Contractor’s option to perform overtime work if so desired. Also, some phases of the work can only be performed during off-hours, on weekends or at night. However, the Contractor shall receive no additional compensation for overtime work performed.

1. Contractor shall advise Owner of his intended work schedule and obtain their approval.
2. Contractor shall not do any electrical or mechanical work at any time which would interfere with the Owner’s service or function without first advising Owner of the nature, proposed time, and duration of the interruption and obtaining approval for the work.

B. The contractor shall present all requests for approval to the Owner not less than five working days before proposed work is scheduled to be done.

C. Nothing in the above-mentioned work schedule shall void the Contractor’s option to perform overtime work if he so desires and is so approved by the Owner. The Contractor is responsible for including all necessary cost to meet the schedule in the bid documents in the base bid. If the contractor requires overtime to meet the schedule in the bid documents, then the cost incurred are to be included in the base bid.

1.07 SAFETY COMPLIANCE

A. In addition to any detailed requirements of this specification, the contractor shall meet the requirements of federal and state standards referenced in Applicable Publications, whichever is more restrictive. Contractor must submit matters of interpretation of these standards to the respective administrative agency for resolution before starting work.

1.08 SEQUENCING OF CONSTRUCTION

A. It is the intent of these specifications that the work shall commence within ten (10) working days of the date of commencement as set forth in the “Notice to Proceed” and that all work shall be completed within the number of days specified.

B. The Contractor shall schedule the work in such a manner that will allow the Owner to fully occupy all spaces at all times. Scheduling of the work will be conducted with the contractor, the engineer and MUSC prior to commencement of the work.

C. No time extension shall be granted for equipment delivery.

END OF SECTION
PART 1 GENERAL

1.01 WORK INCLUDED

A. This section applies to situations in which the Contractor or his representatives including, but not necessarily limited to, suppliers, subcontractors, employees, and field engineers, entering upon the Owner's property.

B. Related Work: Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 01 of these Specifications.

1.02 QUALITY ASSURANCE

A. Promptly upon the award of the Contract, notify all pertinent personnel regarding requirements of this Section.

B. Require that all personnel who will enter upon the Owner's property certify their awareness of and familiarity with the requirements of this section.

1.03 TRANSPORTATION FACILITIES

A. Truck and equipment access:

1. To avoid traffic conflict with vehicles of the Owner's employees and customers, and to avoid over-loading of streets and driveways elsewhere on the Owner's property, limit the access of trucks and equipment to the designated "Contractor's Entrance".

2. Provide adequate protection for curbs and sidewalks over which trucks and equipment pass to reach the job site.

B. Contractor's vehicles:

1. Require contractor's vehicles, vehicles belonging to employees of the contractor, and all other vehicles entering the Owner's property in performance of the work of the contract, to use only the designated access route.

2. Do not permit such vehicles to park on any street or other area of the Owner's property except in the area to be designated.
1.04 SECURITY
   A. Restrict the access of all persons entering upon the Owner's property in connection with the work to the contractor's entrance and to the actual site of the work.

1.05 PROTECTION OF EXISTING PROPERTY
   A. This project involves work in and on the Psychiatric Institute Building. The contractor will be responsible for protecting existing items from damage during construction. This effort will be coordinated during the preconstruction meetings.
   B. After the completion of the construction, the condition of the area shall be restored to its original appearance at the contractor's expense.

1.06 MISCELLANEOUS
   A. Confine operations at site to areas permitted by Owner and Contract Documents.
   B. Do not unreasonably encumber site with materials or equipment.
   C. Do not load structure with weight that will endanger structure.
   D. Assume full responsibility for protection and safekeeping of products stored on premises.
   E. Move any stored products which interfere with operations of Owner.

1.07 MANNER OF CONDUCTION OF WORK
   A. The existing buildings will be occupied during the life of the contract. The work shall be done and such temporary facilities provided, so as not to interfere with the daily operation of the building or any essential service thereof.
   B. Noisy operations, such as drilling, etc shall be restricted by the Owner to avoid disruption of daily activities. The schedule of operation shall be approved by the Owner. No work shall be undertaken and no service shall be interrupted, which does not have the prior approval of the Owner. Every request from the contractor to begin work in a new area to interrupt any service shall have approval and concurrence by the Owner's Administrative Staff.
   C. No jackhammering will be allowed unless written permission is received from the Owner. All holes will be core drilled using a diamond core drill.
   D. Responsibility from enforcing coordination requirements and close adherence to time schedule rests solely with the general contractor.

1.08 SPECIAL SITE CONDITIONS
   A. Trash and debris shall be removed by contractor daily. No food or drink will be allowed inside the existing buildings or any renovated areas.
B. On-site storage and parking will be allowed only in designated area and shall be totally maintained by the General Contractor. This area shall suffice for employee parking, construction trailers and general storage of materials. If additional space is required it shall be the responsibility of the General Contractor to locate and furnish at no additional cost to the Owner. The contractor shall fence and secure the storage area as he deems necessary to secure and protect the area.

END OF SECTION
SECTION 01 25 00

SUBSTITUTIONS (10 DAY PRIOR APPROVAL)

PART 1 GENERAL

1.01 WORK INCLUDED

A. To establish a mandatory method or system of submitting and approval or disapproval of various items, materials, equipment, products etc., in lieu of those specified or indicated.

B. Related Work: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.02 QUALITY ASSURANCE

A. The contract is based on the standards of quality established in the Contract Documents but specific reference in the specifications to any article, device, product, materials, fixture, form or type of construction, etc., by name, make, or catalog number, with or without the words "or equal", shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition and the Contractor in such cases may, at his option, use any article, device, product, material, fixture, form or type of construction which, in the judgement of the Architect/Engineer expressed in writing, is equal to that named.

B. Where quality and other characteristics are very nearly the same, the question of determining equal materials and readily available service sometime resolves itself to a matter of personal opinion and judgement and in these and all other cases involving the approval of materials, the opinion, judgement and decision of the Architect/Engineer and the Owner shall be final and bind all parties concerned.

C. The following products do not require further approval except for interface within the work:

1. Products specified by reference to standard specifications such as ASTM & similar standards.

2. Products specified by manufacturer's name and catalog model number.

1.03 REQUEST FOR APPROVAL

A. Requests for written approval to substitute materials or equipment considered by the Contractor as equal to those specified must have been submitted for approval ten (10) calendar days prior to bid opening date to the Architect/Engineer.

B. Format of Request:

1. Requests must be submitted to the Architect/Engineer in writing.
2. The written request must clearly identify the specification section (and paragraph if appropriate) along with any deviations from the specified product specification.

3. Identify compliance with pertinent standards of quality as listed under the “Quality Assurance” paragraph of part one of the specification section. Identify any deviations or alternate standards of quality.

4. Requests must be accompanied by samples, descriptive literature, and engineering information as necessary to fully identify and allow appraisal of the product.

C. Failure to comply with either the time frame for approval or format for the approval request (as identified in paragraphs A & B above) is in itself sufficient cause for rejection of the approval request.

1.04 APPROVED SUBSTITUTIONS

A. Approval of the Architect/Engineer to use materials and/or equipment, if granted, will have been in the form of a written addendum and will have been issued to all bidders of record. Approved substitutions may be used at Contractor's option.

B. Approval of an item submitted as a request for approval does not relieve that product from compliance with the specification section performance, quality, construction, material or warranty requirements.

C. No substitutions will be allowed, nor will an increase in Contract be allowed (for using materials specified) if substitutions have been requested later than ten (10) days prior to bid opening date.

END OF SECTION
SECTION 01 29 00

SCHEDULE OF VALUES

PART 1 GENERAL REQUIREMENTS

1.01 WORK INCLUDED

A. Provide a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the Work for each project, as specified herein and in other provisions of the contract documents.

1.02 RELATED WORK

A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 01 of these specifications.

B. A “Schedule of Values” is required under the General Conditions. The minimum division of categories shall comply with requirements of this specification. The “Schedule of Values” is required to be compatible with the “Continuation Sheet” accompanying application for payment.

1.03 QUALITY ASSURANCE

A. Use required means to assure arithmetical accuracy of the sums described.

B. When so required by the Engineer, provide copies of the subcontracts or other data acceptable to the Engineer, substantiating the sums described.

1.04 SUBMITTALS

A. Prior to first application for payment, submit proposed schedule of values to the Engineer.
   1. Meet with the Engineer and determine additional data, if any, required to be submitted.
   2. Secure the Engineer’s approval of the schedule of values prior to submitting first application for payment.
   3. A revised schedule of values shall be required after execution of a change order.

PART 2 PRODUCTS

2.01 ORGANIZATION

A. The schedule of values shall be organized and titled under the standard CSI divisions. The contractor may provide additional sub-categories under these divisions as necessary for tracking of sub-contract costs, subject to approval by the Engineer. Example below:
**Division 7 - Thermal and Moisture Protection**

Roofs
- Roof Structure of Steel Fram
- Canopies
- Roof Covers
- Fireproofing

**Division 8 - Doors and Windows**

Doors
- Wood Doors
- Hollow Metal Doors
- Hardware

**Division 9 - Finishes**

Floors
- Quarry and Hard Tile
- Vinyl Tile
- Terrazzo and Resinous Flooring
- Carpet
- Ceramic Tile
- Hardwood

**Division 22 - Plumbing**

- Fixtures
- Piping
- Piping Insulation
- Water Heaters

**Division 23 - Heating and AC**

- Controls
- A/C Systems (over 20 tons)
- A/C Systems (over 5 less than 20 tons)
- A/C Systems (Less than 5 tons)
- Duct Work
- Piping
- Insulation
- Composite system-Heating, Ventilating and A/C
- Heat Pump System
- Chiller
Division 26 - Electrical
   Conduit and Wiring
   Fixtures
   Switchgear

END OF SECTION
SECTION 01 31 00

PROJECT MEETINGS AND COORDINATION

PART 1 GENERAL REQUIREMENTS

1.01 DESCRIPTION

A. Work included: To enable orderly review during progress of the work, and to provide for systematic discussion of problems, the Contractor shall conduct project meetings throughout the construction period. Meeting times and dates shall be set at the Pre-construction conference with the Owner’s Representative and Engineer present.

B. Related Work:

1. Documents affecting the work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division One of these specifications.

2. The Contractor’s relations with his subcontractors and material suppliers, and discussions relative thereto, are the Contractor’s responsibility and normally are not part of the project meetings content.

1.02 QUALITY ASSURANCE

A. For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

1.03 SUBMITTALS

A. Agenda items: To the maximum extent practicable, advise the Owner’s representative at least 24 hours in advance of project meetings regarding items to be added to the agenda.

B. Minutes:

1. The Contractor will compile minutes of each project meeting and will furnish copies to the Owner, Architect/Engineer, and Subcontractors.

2. Recipients of copies may make and distribute such other copies as they wish. Meeting minutes shall include a complete synopsis of all discussions, decisions, and/or problems being encountered on the project, as well as an update of the schedule.
PART 2 PRODUCTS

NO PRODUCTS ARE REQUIRED IN THIS SECTION.

PART 3 EXECUTION

3.01 MEETING SCHEDULE

A. Except as noted below for Preconstruction Meeting, project meetings will be held weekly.

B. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.02 MEETING LOCATION

A. The Contractor will establish meeting location. To the maximum extent practicable, meetings will be held at the job site.

3.03 PRECONSTRUCTION MEETING

A. The pre-construction meeting shall be conducted by the agency’s Project Representative and the Engineer. Other attendees should include the agency’s construction project manager (if assigned), construction inspectors, the general contractor, major sub-contractors, and the OSE Project Manager. The Engineer shall take minutes of the meeting and provide all attendees with a copy of the items discussed.

B. The agency shall give the OSE Project Manager a minimum of seven (7) days notice of the date, time, and place of any pre-construction meeting.

C. Items for discussion during the pre-construction meeting are provided in the following Table-7.3.1
## TABLE 7.3-1. PRE-CONSTRUCTION CONFERENCE

<table>
<thead>
<tr>
<th>Item No.</th>
<th>PRECONSTRUCTION CONFERENCE ITEM</th>
<th>USER COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Introduction of all team members and their responsibilities;</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Project organizational structure and chain of command;</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Duties and expectations of the Agency, A/E, and contractor,</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Contract disputes, mediation, partnering, resolution;</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Project scope of work;</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Schedule of values, schedule of completion;</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Schedule of progress meetings;</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Project work schedule, normal working hours, normal work week;</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Required notice for scheduling overtime, outages, interruptions;</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Safety issues - general and special;</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Temporary and permanent utilities;</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Security, keys, fencing, site access, limited access to certain areas;</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Project sign;</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Designated parking areas, delivery areas;</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Designated storage areas, bonded storage, security;</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Designated toilets, break areas, vending areas, smoking areas;</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Daily clean-up, trash removal, dumpster, trash areas;</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 7.3-1. PRE-CONSTRUCTION CONFERENCE

<table>
<thead>
<tr>
<th>Item No.</th>
<th>PRECONSTRUCTION CONFERENCE ITEM</th>
<th>USER COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.</td>
<td>Submittals, shop drawings, testing, reports, approval process;</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Required permits, licenses, local inspections, testing;</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Demolition items to be salvaged for agency, if any, notification, storage area;</td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>Requirement to locate utilities prior to excavation;</td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Contractor’s bonds (as required by SC Law), names of surety companies, required notification for claims;</td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Builders’ Risk Insurance and contractor’s insurance;</td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Agency furnished equipment, rough-in, trim;</td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>Application for Payment in the form of AIA G702, payment dates, payment for stored materials;</td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>Prompt payments to contractors in 21 days, subcontractors 7 days thereafter;</td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>Timely notification by the Contractor in writing to the A/E of any alleged agency-caused delay and the estimated cost of the delay;</td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>Additional weather related time extensions monthly;</td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>Change orders, change directives, clarifications;</td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>Required inspections by A/E, agency, and inspectors (where applicable),</td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>Inspection report routing;</td>
<td></td>
</tr>
<tr>
<td>32.</td>
<td>Material and soil testing requirements;</td>
<td></td>
</tr>
<tr>
<td>33.</td>
<td>Review requirements for substantial completion</td>
<td></td>
</tr>
<tr>
<td>34.</td>
<td>Substantial Completion inspection, and notification procedure</td>
<td></td>
</tr>
<tr>
<td>Item No.</td>
<td>PRECONSTRUCTION CONFERENCE ITEM</td>
<td>USER COMMENTS</td>
</tr>
<tr>
<td>---------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>35.</td>
<td>Substantial Completion certification by the A/E;</td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>Occupancy, Partial occupancy;</td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>Assessment of liquidated damages;</td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>Required Operation and Maintenance Manuals <em>(provide prior to Substantial Completion)</em></td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>Instruction and training of maintenance personnel <em>(provide prior to move-in/occupancy)</em></td>
<td></td>
</tr>
<tr>
<td>40.</td>
<td>Warranties, manufacturer start-up, guarantees <em>(provide prior to Substantial Completion)</em></td>
<td></td>
</tr>
<tr>
<td>41.</td>
<td>Record drawings, as built drawings;</td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>Final Completion inspection, punch list;</td>
<td></td>
</tr>
<tr>
<td>43.</td>
<td>Retainage withheld, consent of surety company before release of retainage;</td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>One year inspection (A/E to inspect the facility 10 months after substantial Completion).</td>
<td></td>
</tr>
<tr>
<td>45.</td>
<td>Contractor is responsible for making corrections to items found during the warranty inspection.</td>
<td></td>
</tr>
</tbody>
</table>
3.04 PROJECT MEETINGS

A. Attendance

1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of work.

2. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspect of the work is involved.

B. Minimum agenda:

1. Review, revise as necessary, and approve discussions, agreements and understanding of the previous meeting.

2. Review progress of the work since last meeting, including status of submittals for approval.

3. Identify problems that impede planned progress.

4. Develop corrective measures and procedures to regain planned schedule.

5. Complete other current business.

END OF SECTION
SECTION 01 32 00
CONSTRUCTION SCHEDULES

PART 1 GENERAL

1.01 WORK INCLUDED
A. To assure adequate planning and execution of the work and aid in completing construction within the number of calendar days allowed in the Contract, and to assist the Architect/Engineer in evaluating progress of the Work, prepare & maintain the schedules and reports described in this Section.
B. Documents affecting scheduling include, but are not limited to, General Conditions, Supplementary Conditions, and Sections in Division 01 of these specifications.

1.02 DEFINITIONS
A. "Day", as used throughout the Contract unless otherwise stated, means "calendar day".

1.03 QUALITY ASSURANCE
A. Employ a scheduler who is thoroughly trained and experienced in compiling construction schedule, and in preparing and issuing periodic updates and reports as required. The scheduler shall be actively and regularly engaged in the practice of scheduling construction projects. The cost of providing the initial schedule and biweekly updates shall be part of the base bid.
B. Perform data preparation, analysis, charting, and updating in accordance with standards approved by the Architect/Engineer.

1.04 SUBMITTALS
A. Comply with pertinent provisions of Submittals, section 013300.
B. Construction schedule: Within 30 calendar days after the Contractor has received the Notice to Proceed, submit one reproducible copy of a construction schedule.
C. Periodic revisions and reports: Submit one copy of the construction schedule updated along with the monthly payment request.

PART 2 PRODUCTS

2.01 CONSTRUCTION ANALYSIS
A. Graphically show by bar-chart the order and interdependence of all activities necessary to complete the work, and the sequence in which each activity is to be accomplished, as planned by the Contractor and his project field superintendent in coordination with all subcontractors whose work is shown on the diagram.
PART 3 EXECUTION

3.01 CONSTRUCTION SCHEDULE

A. As soon as practicable after receipt of Notice to Proceed, complete the construction analysis in preliminary form, meet with the Architect/Engineer, review contents of the proposed construction schedule, and make all revisions agreed upon.

3.02 PERIODIC REVISIONS AND REPORTS

A. As required under Paragraph 1.04-C above, update the approved construction schedule along with each payment certificate. Indicate "actual" progress in percent completion for each activity in blank space provided below listed activity and provide written narrative summary of revisions causing delay in the program, and an explanation of corrective actions taken or proposed.

END OF SECTION
SECTION 01 33 00

SUBMITTALS

PART 1 GENERAL REQUIREMENTS

1.01 COORDINATION WITH OTHER SECTIONS OF CONTRACT

A. Refer to other sections of the contract specifications for detailed submittal requirements for each Section. At a minimum, submittals must meet the requirements in this Section. More detailed submittals may be required by other Sections. The submittal must meet the most stringent of the requirements.

1.02 SUBMITTALS

A. Submit shop drawings, product data as required to the Owner in sufficient number to allow the Owner to retain two copies. Make all submittals at one time. Make all submittals no later than two weeks after receipt of the “Notice to Proceed.” Contact Engineer in advance if submittal will not be within two weeks of receipt of “Notice to Proceed.”

B. Shop drawings shall be submitted in a clear and thorough manner. Details shall be identified by reference to sheets and details, schedules and room numbers shown on the Contract Drawings and Division of the specification and indexed accordingly.

C. Product Data shall clearly identify pertinent products and models on each copy. Show performance characteristics, capacities, dimensions, clearances, wiring, piping diagrams, and controls as required. Modify manufacturer’s standard schematic drawings and diagrams to provide information specifically applicable to the work.

D. Samples shall be of sufficient size and quantity to clearly illustrate functional characteristics of the product.

1.03 CONTRACTOR RESPONSIBILITIES

A. Review Shop Drawings, Product Data and Samples prior to submission.

B. Determine and Verify:

1. Field measurements

2. Field construction criteria

3. Catalog numbers and similar data

4. Conformance with specifications

C. Coordinate each item submitted with requirements of the work and of the Contract Documents.
D. Notify the Owner in writing, at time of submission, of any deviations in the submittals from requirements of the contract Documents.

E. Do not begin fabrication (or any work that requires submittals) until submittals are returned with the Owner’s approval.

1.04 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the Work or in the work of any other Contractor.

B. Number of submittals required:
   1. Shop Drawings: Submit one reproducible transparency and one opaque reproduction.
   2. Product Data: Submit the number of copies that the Contractor requires, plus two which will be retained by the Owner.
   3. Samples: Submit the number stated in each specification Division.

C. Submittals shall contain:
   1. The date of submission and the dates of any previous submissions.
   2. The project title and number.
   4. The names of:
      a. Contractor
      b. Supplier
      c. Manufacturer
   5. Identification of the product, with the specification Division number.
   6. Field dimensions, clearly identified as such.
   7. Relation to adjacent or critical features of the Work or materials.
   8. Applicable standards, such as ASTM or Federal Specification numbers.
   10. Identification of revisions on re-submittals.
   11. An 8 in. x 3 in. Blank space for Contractor and Owner stamps.
   12. Contractor’s stamp, initialed or signed, certifying review of the submittal. Stamp and signature indicate that the following have been reviewed:
• verification of products
• field measurements
• field construction criteria
• coordination of the information within the submittal with requirements of the Work and Drawings
• coordination of the information within the submittal with requirements of Contract Documents.

1.05 RESUBMISSION REQUIREMENTS

A. Make any corrections or changes in the submittals required by the Owner and resubmit until approved.

B. Shop Drawings and Product Data:
   1. Revise initial drawings or data, and resubmit as specified for the initial submittal.

1.06 DISTRIBUTION: Distribute reproductions of Shop Drawings and copies of product Data that carry the Owner stamp of approval to:

A. Job site file.
B. Record Documents file.
C. Other affected contractors.
D. Subcontractors.
E. Supplier or Fabricator.

1.07 OWNER DUTIES

A. Review submittals with reasonable promptness and in accordance with approved schedule.
B. Affix stamp and initials or signature, and indicate requirements for re-submittal, or approval of submittals.
C. Return submittals to Contractor for distribution, or for resubmission.

END OF SECTION
SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

2. Specified tests, inspections, and related actions do not limit Contractor’s quality-control procedures that facilitate compliance with the Contract Document requirements.

3. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities have jurisdiction are not limited by provisions of this Section.

1.03 DEFINITIONS

A. Quality-Assurance Services: Activities, actions and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.

C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
1.04 SUBMITTALS

A. Qualification Data: For testing agencies specified in “Quality Assurance” Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Ambient conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient projection capacity to produce required units.

B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer’s products that are similar in material, design, and extent to those indicated for this Project.

C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.

F. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.

1.06 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner’s responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephones numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.

2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.

1. Where services are indicated as Contractor’s responsibility, engage a qualified testing agency to perform these quality-control services.

   a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies at least [24] hours in advance of time when Work that requires testing or inspecting will be performed.

3. Where quality-control services are indicated as Contractor’s responsibility, submit a certified written report, in duplicate, of each quality-control service.

4. Testing and inspecting requested by Contractor and not required by the Contract Document are Contractor’s responsibility.

5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
C. Manufacturer’s Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor’s responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.


1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.

4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.

5. Do not perform any duties of Contractor.

F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.

2. Incidental labor and facilities necessary to facilitate tests and inspections.

3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.

4. Facilities for storage and field-curing of test samples.

5. Preliminary design mix proposed for use for material mixes that require control by testing agency.

6. Security and protection for samples and for testing and inspecting equipment at project site.
G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspection, obtaining samples, and similar activities.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substances and finishes.

1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor’s responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION
PART 1 GENERAL

1.01 WORK INCLUDED

A. Contractor shall furnish, maintain and remove at completion of project, all temporary equipment that is required for the proper execution of work of all trades and is further described in this section of specifications.

B. Related Work: Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these specifications.

C. Inspect equipment furnished by subcontractors to insure that equipment complies with requirements of pertinent safety regulations.

D. Maintain temporary facilities and controls in proper and safe condition throughout progress of the work.

PART 2 PRODUCTS

2.01 CONTRACTORS’ TEMPORARY EQUIPMENT

A. Contractor shall furnish, maintain and remove at completion equipment such as temporary stairs, ladders, ramps, chutes, and like facilities, as required for proper execution of the work.

B. Contractor shall coordinate the provisions of exterior and interior scaffolding required for execution of this work. Such scaffolding shall conform to requirements of authorities having jurisdiction over such work and be maintained in safe condition at all times. Remove when no longer required.

2.02 LIFTING DEVICES AND HOISTING FACILITIES

A. Contractor shall provide, operate, and maintain construction elevators, or cranes as well as other type hoists and hoisting material as may be required for execution of all trades’ work. Such apparatus, equipment and construction shall meet requirements of labor laws and other state or local laws.

2.03 BARRIERS

A. Comply with Federal, State, and Local codes and regulations.

B. Contractor shall provide and maintain bracing, shoring, sheeting, lights (warning and exit), guardrails, barricades, warning signs and other features necessary to adequately protect persons and property. When the need no longer exists remove such protective devices and/or procedures.
2.04 SECURITY ENCLOSURES AND PRECAUTIONS

A. Contractor shall provide all temporary enclosures required for protecting the project from the exterior, for providing passageways, for the protection of openings both exterior and interior and any other location where temporary enclosures and protection may be required.

B. Contractor shall take adequate precautions against fire, keep flammable material at an absolute minimum, and ensure that such material is properly handled and stored.

2.05 TELEPHONE SERVICE

A. Contractor shall provide and maintain a job telephone for the duration of the contract, and shall pay all costs in connection therewith. Toll calls shall be paid for by the party making the call.

2.06 TEMPORARY SANITARY FACILITIES

A. Permanent toilet facilities may be used by the construction personnel upon written permission of the Owner and subject to conditions mutually agreed to in writing.

2.07 TEMPORARY ELECTRICITY

A. The Contractor shall make the necessary arrangements and provide all temporary electrical services and lighting required during construction. Electricity at its source shall be furnished to Contractor by Owner.

2.08 TEMPORARY WATER DURING CONSTRUCTION

A. The contractor shall make arrangements to provide all water required during construction. Water, at source, to be furnished by the Owner.

2.09 ACCESS ROADS AND PARKING AREAS

A. Access to site for delivery of construction equipment and materials shall be made only from locations designated by Owner.

B. Parking of employee and Contractor vehicles on the site shall be limited to area or areas shown on drawings, or where not shown, as approved by Owner. Vehicles illegally parked will be removed from site at the expense of vehicle owner.

2.10 EXISTING BUILDING, NEW CONSTRUCTION SEPARATION

A. Contractor shall provide temporary enclosures to separate work areas from the areas of existing buildings occupied by Owner; to prevent penetration of dust or moisture into occupied areas, to prevent damage to existing equipment, and to protect Owner’s employees and operations from construction work.

B. Use framing and sheet materials which comply with structural and fire rating requirements of applicable codes and standard for temporary partition and ceiling enclosures.
C. Close joints between sheet materials and seal edges and intersections with exiting surfaces, to prevent penetration of dust or moisture.

D. In locations where painting is required, use fire-retardant paint providing a maximum flame spread of 25 when tested under ASTM E 84 or as required by local regulations.

E. Contractor shall provide HEPA filtered negative pressure fans for the purpose of negative pressure in all construction areas in the Hospital. The discharge of the negative pressure fans and filters shall to the outside of the facility and shall not be located within 25 feet of any outside air intakes for hospital HVAC systems. Construction space pressure shall be maintained at negative 0.01” w.c.

F. Contractor shall provide Plywood or equal to insure the proper protection of the existing roofing system and skylights.

G. All unused and stored gas cylinders shall be chained and secured.

PART 3 EXECUTION

3.01 TEMPORARY FACILITIES AND CONTROLS

A. Requirements of Regulatory Agencies: Comply with Federal, State and local codes and regulations and with utility company requirements.

B. Materials, General: Materials may be new or used suitable for the intended purpose, must be adequate in capacity for required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

C. The Contractor shall provide all weather protection and temporary cooling as necessary to carry on the work being conducted in the building. Contractor shall maintain properly conditioned working conditions except at specific times approved in advance by the Owner.

D. At completion of the work, when existing equipment has been utilized, the Contractor shall restore all equipment to “Original Condition.” This shall include replacement of all filters, painting, and other servicing required.

3.02 MAINTENANCE AND REMOVAL

A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the work.

B. Remove such temporary facilities and controls as rapidly as progress of the work will permit, or as directed by the Architect/Engineer.

C. At the completion of contract, remove all temporary buildings, sheds and trailers from the site and leave the grounds in the condition specified in other sections.

END OF SECTION
PART 1 GENERAL REQUIREMENTS

1.01 WORK INCLUDED: This Section establishes general requirements pertaining to cutting (including excavating), fitting, and patching of the Work required to:

A. Make the several parts fit properly.
B. Uncover Work to provide for installation, inspection, or both of ill-timed Work.
C. Remove and replace Work not conforming to requirements of the Contract Documents.
D. Remove and replace defective Work.
E. The work of this section shall include all patching of any existing substrate or finish material that is displaced, disturbed, marred or otherwise damaged by the operations of the work of this contract.
F. Patching is herein further understood to include replacement of certain materials that, by their nature, cannot be patched such as resilient base, resilient flooring, etc. This statement primarily concerns itself with finishes in existing areas indicated to remain as part of the finished project.
G. For alterations and additions the repair of all damages made by cutting shall include restoring those surfaces to their original state of finish, including surface texture, design color, etc., unless new finishes are called for. All such repairs shall be performed by personnel trained and proficient in the particular trades involved; i.e., plaster repairs by plasterers, masonry repairs by masons, tile repairs by tile setters, etc. Masonry and tile repairs shall be toothed to maintain bond or pattern. It is the intent of these specifications that all areas requiring repairs shall be restored to a completely finished condition, acceptable to the Owner.

1.02 INSPECTION

A. The contractor shall visit the building, inspect the areas in which work is to be performed and determine for himself the types and extent of finishing materials existing.
B. He shall determine which materials will probably require patching and which will probably require replacement and to what extent.
C. Failure to do so will not relieve him from this responsibility to conform to the requirements of this section.
1.03 RELATED WORK DESCRIBED ELSEWHERE

A. In addition to other requirements specified, upon the Owner’s request, uncover Work to provide for inspection by the Owner of covered Work; and remove samples of installed materials for testing.

B. Do not cut or alter work performed under separate contract without the Owner’s written permission.

1.04 QUALITY ASSURANCE

A. Perform all cutting and patching in strict accordance with pertinent requirements of these Specifications and, in the event no such requirements are determined, in conformance with the Owner’s written direction.

1.05 SUBMITTALS

A. Request for the Owner’s consent:

1. Prior to cutting which affects structural safety, submit written request to the Owner for permission to proceed with cutting.
2. Should conditions of the Work, or schedule, indicate a required change of materials or methods for cutting and patching, so notify the Owner and secure his written permission prior to proceeding.

B. Notices to the Owner

1. Prior to cutting and patching pursuant to the Owner’s instructions, submit cost estimate to the Owner. Secure the Owner’s approval of cost estimate and type of cost reimbursement before proceeding with cutting and patching.
2. Submit written notice to the Owner designating time the work will be uncovered, to provide for the Owner’s observation.

PART 2 PRODUCTS

2.01 MATERIALS: For replacement of Work removed, use materials which comply with the pertinent sections of these specifications.

2.02 PAYMENT FOR COSTS: The Owner will reimburse the contractor for cutting and patching performed pursuant the Owner’s written request after claim for such reimbursement is submitted by the Contractor. Perform all other cutting and patching needed to comply with the Contract Documents at no additional cost to the Owner.

2.03 EXISTING ADJACENT FINISHES

A. The intent of this specification is that all finished surfaces shall present an unblemished finished appearance conforming to existing adjoining materials and colors.
PART 3 EXECUTION

3.01 CONDITIONS

A. Inspection:

1. Inspect existing conditions, including elements subject to movement or damage during cutting and patching.
2. After uncovering the Work, inspect conditions affecting installation of new Work.

B. Discrepancies:

1. If uncovered conditions are not as anticipated, immediately notify the Owner and secure needed directions.

3.02 PREPARATION PRIOR TO CUTTING: Provide all required protection including, but not necessarily limited to, shoring, bracing, and support to maintain structural integrity of the Work.

3.03 PERFORMANCE: Perform cutting and demolition by methods which will prevent damage to other portions of the Work and will provide proper surfaces to receive installation of repair and new work. Perform fitting and adjustment of products to provide finished installation complying with the specified tolerances and finishes.

3.04 CONCRETE

A. Concrete shall be patched by cutting out old concrete to remove loose aggregate cement with rectangular sides. Apply approved bonding agent to old concrete to insure firm juncture of new and old.

3.05 CLEAN UP

A. Remove all debris and excess material from the site and legally dispose of it.

END OF SECTION
PART 1 GENERAL

1.01 WORK INCLUDED

A. Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this section.

B. Execute cleaning, during progress of the work, and at completion of the work, as required by General Conditions.

C. In addition to standards described in this Section, comply with requirements for cleaning for specific products or work as described in their sections of these specifications.

D. Related Documents: Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.02 QUALITY ASSURANCE

A. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.

B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

1.03 DISPOSAL REQUIREMENTS

A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

B. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.

C. Use only those cleaning materials and methods recommended by manufacturer of surface material to be cleaned.

D. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.
PART 3 EXECUTION

3.01 GENERAL PROGRESS CLEANING

A. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.

B. Do not allow accumulation of scrap, debris, waste material, and other items not further required for construction of this work.

C. At least twice each week, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.

D. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.

3.02 SITE PROGRESS CLEANING

A. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to place designated for their storage.

B. Weekly, and more often if necessary, inspect all arrangements of materials stored on site. Restack, tidy, or otherwise service arrangements to meet the requirements of Subparagraph 3.01A above.

C. Maintain the site in a neat and orderly condition at all times.

D. Execute periodic cleaning to keep work, site and adjacent properties free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.

E. Remove waste materials, debris and rubbish from site and dispose of at a legal disposal area away from the site.

3.03 STRUCTURES PROGRESS CLEANING

A. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Relocate such items to the place designated for their storage.

B. Weekly and more often if necessary, sweep interior spaces broom clean.

C. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.

3.04 DUST CONTROL

A. Clean interior spaces prior to start of finish painting and continue cleaning on an as-needed basis until painting is finished.
B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.

3.05 FINAL CLEANING

A. Employ skilled workmen for final cleaning.

B. "Clean", for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.

C. Remove all traces of soil, grease, mastic, waste materials, adhesives, dust, dirt, stains, smudges, fingerprints, labels, and other foreign materials from sight exposed interior and exterior surfaces.

D. Wash and polish glazing and mirrors.

E. Polish surfaces requiring routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished.

F. Ventilating Systems:
   1. Clean permanent filters and replace disposable filters if units were operated during construction.
   2. Clean ducts, blowers and coils if units were operated without filters during construction.

G. Prior to final completion, or Owner occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces, and all work areas, to verify that entire work is clean.

H. Schedule final cleaning as approved by the Architect/Engineer to enable the Owner to accept a completely clean Project.

I. Owner will assume responsibility for cleaning as of time designated on Certificate of Substantial Completion for Owner's acceptance of Project or portion thereof; except for cleaning required due to execution of punch list items, which shall remain the responsibility of the General Contractor.

END OF SECTION
SECTION 01 77 00

CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 WORK INCLUDED

A. To provide an orderly and efficient transfer of the building and building component information to the Owner. Closeout submittals shall consist of the following items:

- Closeout, Warranty and Operation and Maintenance Documents
- Record (as-built) Drawings and Specifications

1.02 QUALITY ASSURANCE

A. One copy of all project closeout submittals shall be forwarded to the Engineer for review and approval prior to forwarding the information required by this section to the Owner. Approval of these documents shall be considered as a pre-requisite for certification of Final Completion.

1.03 MATERIALS LIST

A. Furnish the Owner, three identical copies of a typewritten list showing every manufactured item / material used on the job. Include catalog number, manufacturer’s name and address, distributor’s name and address. Type the lists neatly and index them according to respective sections of specifications.

1.04 CLOSEOUT, WARRANTY, OPERATION AND MAINTENANCE DOCUMENTS

A. Prepare one 3-ring binder titled with the name of the project and date. The binder shall contain, in order, the following information:

1. The Contractor’s name, address, telephone number, fax number and the name of the project manager. Provide contact information for the Contractor’s representative that includes telephone and beeper numbers where the person can be reached for emergency service at all times including nights, weekends, and holidays.

2. The names, addresses, telephone numbers for each major subcontractor.

3. Evidence of compliance with requirements of governmental agencies having jurisdiction including, but not necessarily limited to Certificate of Inspection for Plumbing, Mechanical and Electrical.

4. Certificate of Insurance for products and completed operations.

5. Evidence of payment and release of liens.
6. In order of division, following the order of the section of this specification, all warranty information specifically required by the sections of this specification.

7. In order of division -- following the order of the sections of this specification – catalogs, wiring and control diagrams, manufacturer’s data, maintenance and operation instructions, parts lists on all devices, fixtures, machines, appliances, mechanical and electrical equipment, etc., for permanent maintenance records.

8. Electronic copy of all of the above materials and information in PDF format on CD.

B. Arrange to instruct operating and maintenance personnel of Owner in use and maintenance of mechanical systems and associated control systems and specialty equipment provided under this contract. Submit letter showing when training was held and who attended.

1.05 COMPLETE AND SUBMIT a request for a partial and a full substantial completion to Engineer.

1.06 COMPLETE AND SUBMIT Contractor’s Affidavit of Payment of Debts and Claims.

1.07 COMPLETE AND SUBMIT Contractor’s Affidavit of Release of Liens.

1.08 PROVIDE a clean and readable set of project Record Documents showing all deviations or changes in routing, location, or installation procedures made during the course of construction. Deliver Record Documents to Architect/Engineer for Owner. Refer to Section 017839 for details. Accompany this submittal with a transmittal letter, in duplicate, containing:

- Date
- Project Title and commission number
- Contractor’s name and address
- Title and number of each Record Document
- Signature of contractor or his authorized representative


1.10 PROVIDE AIA Documents G715 Instruction Sheet and Attachment for Acord Certificate of Insurance issued by an authorized representative of the contractor’s insurance company certifying completed project insurance coverage as required by the contract documents.

1.11 A STATEMENT that the Contractor knows of no reason that the completed project insurance will not be renewable to cover the period required by the contract documents.

1.12 RETURN ALL CONTRACTOR’S Identification Badges prior to receipt of final payment.

END OF SECTION
SECTION 01 77 00.01

PROJECT CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 WORK INCLUDED

A. To provide an orderly and efficient transfer of the building and building component information to the Owner. Closeout submittals shall consist of:

1. Closeout, Warranty & Operation and Maintenance Documents
2. Record (as-built) Drawings

1.02 QUALITY ASSURANCE

A. One copy of all project closeout submittals shall be forwarded to the Architect/Engineer for review and approval prior to forwarding the information required by this section to the Owner. Approval of these documents shall be considered as a pre-requisite for certification of Final Completion.

1.03 CLOSEOUT, WARRANTY & OPERATION AND MAINTENANCE DOCUMENTS

A. At the Final Completion of the project the General Contractor shall prepare one 3 ring binder titled with the name of the project and date. The binder shall contain, in order, the following:

1. The General Contractor’s name, address, telephone number, fax number and the name of the project manager or contact person representing the General Contractor, including addresses and telephone numbers where that person can be reached for emergency service at all times including nights, weekends, and holidays.

2. The names, addresses, telephone numbers for each major subcontractors including:
   a. Plumbing sub-contractor
   b. Mechanical sub-contractor
   c. Electrical sub-contractor
   d. Roofing sub-contractor

3. When applicable evidence of compliance with requirements of governmental agencies having jurisdiction including, but not necessarily limited to:
   a. Certificates of Inspection for Plumbing, Mechanical and Electrical.
   b. Certificates of Occupancy.

4. Certificates of Insurance for products and completed operations.

5. Evidence of payment and release of liens.


7. In order of division, following the order of the sections of this specification, all warranty information specifically required by the sections of this specification.

8. In order of division, following the order of the sections of this specification, catalogs, wiring and control diagrams, manufacturer's data, maintenance and operation instructions, parts lists on all devices, fixtures, machines, appliances, mechanical and electrical equipment, etc., for permanent maintenance records.

1.04 RECORD DOCUMENTS

A. Throughout progress of the work, the contractor shall maintain an accurate record of actual construction and changes of the contract documents.

B. The purpose of the Record Documents is to provide factual information regarding all aspects of the work, both concealed and visible, to enable future modification of the work to proceed without lengthy and expensive site measurement, investigation, and examination.

C. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of specifications as to actual products used and each sheet of drawings and other documents where such entry is required to show the change properly.

D. Accuracy of records shall be such that future search for items shown in the Contract Documents may rely reasonably on information obtained from the Project Record Documents.

E. The Record Documents shall be made available to the Architect/Engineer for review upon request, and the Architect's approval of the current status of Project Record Documents may be a prerequisite to the Architect's/Engineer approval of requests for progress payment and request for final payment under the contract.

F. Record Document Handling:

1. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the work.

2. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
G. Content: Promptly following receipt of the Owner's Notice to Proceed, secure from the Architect at no charge to the contractor one complete set of all documents comprising the contract. Immediately upon receipt of the job set described in Paragraph 2.01(A) above, identify each of the Documents with the title, "RECORD DOCUMENTS - JOB SET". Maintain at site for Owner one Record Copy of:

1. Drawings
2. Specifications
3. Addenda
4. Change Orders and other Modifications to Contract
5. Architect/Engineer Field Orders or written instructions
6. Approved shop drawings, product data and samples
7. Field Test Reports

H. Making entries on Drawings:

1. Using an erasable colored pencil, clearly describe the change by note or drawing.
2. Call attention to the entry by a "cloud" drawn around the area or areas affected.
3. In the event of overlapping changes use different colors for the overlapping changes.
4. Legibly mark drawings to record actual construction such as:
   a. Depths of various elements of foundation in relation to finish first floor datum.
   b. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   c. Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the structure.
   d. Field changes of dimension and detail.
   e. Changes made by Field Order or by Change Order.
   f. Details not on original contract drawings.

I. Make entries in the specifications, addenda and other pertinent documents by legibly marking each section to record the manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed. Indicate changes made by Field Order or by Change Order.
J. Show on the job set of Record Drawings, by dimension accurate to within one inch, the centerline, etc., of each run of items such as are described above. Clearly identify the item by accurate note such as "cast iron drain", "galv. water", and the like. Show, by symbol or note, the vertical location of the item ("under slab", "in ceiling plenum", "exposed", and the like).

K. At Contract closeout, deliver Record Documents to Architect/Engineer for Owner. Accompany this submittal with a transmittal letter in duplicate containing:

1. Date
2. Project title, and commission number
3. Contractor's name and address
4. Title and number of each Record Document
5. Signature of contractor or his authorized representative

END OF SECTION
PART 1 GENERAL REQUIREMENTS

1.01 WORK INCLUDED

A. Throughout progress of the Work of this Contract, maintain an accurate record of all changes in the Contract Documents, as described in Article 3.01 below.

B. Upon completion of the Work of this Contract, transfer the recorded changes to a set of Record Documents, as described in Article 3.02 below.

1.02 RELATED WORK DESCRIBED ELSEWHERE

A. Submittals: Section 01 33 00

1.03 QUALITY ASSURANCE

A. General: Delegate the responsibility for maintenance of Record Documents to one person on the Contractor’s staff as approved in advance by the Owner.

B. Accuracy of records: Thoroughly coordinate all changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to properly show the change. Accuracy of records shall be such that future search for items shown in the contract Documents may reasonably rely on information obtained from the approved Record Documents.

C. Timing of entries: Make all entries within 24 hours after receipt of information.

1.04 SUBMITTALS

A. The Owner’s approval of the current status of Record Documents will be a prerequisite to the approval of requests for progress payment and request for final inspection and final payment under the Contract.

1.05 PRODUCT HANDLING

A. Use all means necessary to maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of the recorded data to the final Record Documents. In the event of loss of recorded data, use all means necessary to secure data to the Owner’s approval; such means include, if necessary in the opinion of the Owner, removal and replacement of concealing materials and, in such case, all replacements shall be to the standards originally specified in the Contract Documents at no cost to the Owner.
PART 2 PRODUCTS

2.01 RECORD DOCUMENTS

A. Job set: Promptly following award of contract, secure from the Owner, at no charge to the contractor, one complete set of all Documents comprising the Contract.

B. Final Record Documents: At a time near the completion of the Work, but prior to final inspection and final payment, secure from the Owner at no charge to the Contractor, one complete set of all Drawings included in the Contract.

PART 3 EXECUTION

3.01 MAINTENANCE OF JOB SET

A. Identification: Immediately upon receipt of the job set described in Paragraph 2.01 above, identify each of the Documents with the title “RECORD DOCUMENTS - JOB SET.” Maintain the following on site: of:

- Drawings
- Specifications
- Addenda
- Change Orders and other Modifications to Contract
- Architect/Engineer Field Orders or written instructions
- Field Test Reports

B. Preservation:

1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Owner.

2. Do not use the job set for any purpose except entry of new data and for review by the Owner, until start of transfer of data to final Record Documents.

3. Maintain the job set at the site of Work as the Architect designates that site.

C. Making entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by note and by graphic line, as required. Date all entries. Call attention to the entry by a “cloud” around the area or areas affected. In the event of overlapping changes, different colors may be used for each of the changes.
D. Making entries on other Documents:

1. Where directives issued by the Owner cause changes, clearly indicate the change by note in ink, colored pencil, or rubber stamp.

2. When changes are caused by Contractor originated proposals approved by the Owner, including inadvertent errors by the Contractor which have been accepted by the Owner, clearly indicate the change by note in erasable colored pencil.

3. Make entries in the specifications, addenda and other pertinent documents by legibly marking each section to record the manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed. Indicate changes made by Field Order or by Change Order.

4. Make entries in the pertinent Documents as approved by the Owner.

E. Conversion of schematic layouts:

1. In most cases on the Drawings, arrangements of conduits and circuits, piping, duct, and other similar items, is shown schematically and is not intended to portray precise physical layout. The contractor, subject to the Owner’s approval determines final physical arrangement. However, design of future modifications of the facility may require accurate information as to the final physical arrangement of items that are shown only schematically on the Drawings.

2. Shown on the job set of Record Drawings, by dimension accurate to within 24 mm (1"), the center line of each run of items such as conduits and circuits, piping, duct, and other similar items. Clearly identify each item by accurate note. Show, by symbol or note, the vertical location of the item to indicate if it is under slab, in ceiling, exposed, etc. Make all identification sufficiently descriptive that it may be related reliably to the Specifications.

3. The Owner may waive the requirements for conversion of schematic data where, in the Owner’s judgment such conversion serves no beneficial purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Owner.

4. Timing of entries: Be alert to changes in the Work from how it is shown in the Contract Documents. Promptly, and in no case later than 24 hours after the change has occurred and been made known to the Contractor, make the entry or entries required.

F. Accuracy of entries: Use all means necessary, including the proper tools for measurement, to determine actual locations of the installed items.
3.02 FINAL RECORD DOCUMENTS

A. General: The purpose of the final Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification of design to proceed without lengthy and expensive site measurement, investigation, and examination. Provide a single bookmarked PDF file with bookmarks for each section and part. Provide 4 CD’s and 2 complete drawing sets of record drawings.

B. Approval of recorded data prior to transfer: Following receipt of the Final Record Documents described in Paragraph 2.01.B above, and prior to start of transfer of recorded data thereto, secure a review by the Engineer and Owner of all recorded data. Make all required revisions.

C. Approval of recorded data prior to transfer: Carefully transfer all change data shown on the job set of Record Drawings to the Final Record Document. Coordinate the changes as required and clearly indicate at each affected detail and other drawing the actual location of items. Call attention to each entry by drawing a “cloud” around the area or areas affected. Make all change entries on the drawings neatly, consistently, and in ink or crisp black pencil.

D. Transfer of data to other Documents: If the Documents (other than Drawings) have been kept clean successfully during progress of the Work, and if entries have been sufficiently orderly thereon to the approval of the Engineer, the job set of those Documents (other than Drawings) will be accepted by the Owner as final Record Documents for those Documents. If any such document is not approved by the Engineer, secure a new copy of that Document from the Owner and carefully transfer the change data to the new copy.

E. Review and approval: Submit the completed total set of Record Documents to the Owner. Participate in review meeting(s) as required by Engineer or Owner. Make all required changes in the Record Documents and promptly deliver the final Record Documents to the Engineer prior to requesting a final inspection and final payment under the contract.

3.03 CHANGES SUBSEQUENT TO ACCEPTANCE

A. The Contractor shall have no responsibility for recording changes in the Work subsequent to acceptance of the Work by the Owner, except for changes resulting from replacements, repairs, and alterations made by the Contractor as part of this guarantee.

END OF SECTION
PART 1 GENERAL

1.01 SPECIAL NOTES

A. Work under this section of the specifications shall be governed by requirements there under.

B. The use of the word "PROVIDE" in the specifications and on drawings for work under this section shall mean: Furnish and install complete, supplying all necessary labor and materials.

C. This section applies to all sections of Division 23 of this project except as specified otherwise in the individual sections and here-in. Work described in this section includes general requirements common to all mechanical systems. Provisions of this section apply to all mechanical specification sections.

D. References: Refer to the General Conditions for the Contract, the Supplementary General Conditions for the Contract, and the Subdivisions of Division 1; all of which are contained in or referenced as a part of this Project Manual. Instructions relating to the overall operations of the Contractor, as they may apply and as contained in the referenced Subdivisions, will be equally applicable to his subcontractors, equipment and material suppliers and/or installers, and other persons or companies having work requirements, this project.

1.02 GENERAL REQUIREMENTS

A. Provide necessary labor, material, plant and equipment including materials not specifically mentioned, but necessary to complete the job in a neat, correct and workmanlike manner.

B. The drawings and specifications shall be considered as supplementary, one to the other, so that materials and labor indicated, called for or implied by the one and not the other, shall be supplied and installed as though specifically called for by both.

C. All electrical equipment shall be UL listed and all gas equipment is to be AGA certified.

D. All items shall be properly lubricated and in perfect operation upon completion of the project and prior to final acceptance by owner.

E. Contractor shall be held responsible for having visited job site and having familiarized himself with existing conditions prior to submitting bid. If any existing problems are identified, notify Architect in writing prior to submitting bid.
1.03 SCOPE

A. Refer to Section 230000 for a detailed description of the project scope.

1.04 SPACE CONDITIONS

A. All work shall fit the spaces available. Verify all dimensions of the work before commencing fabrication and/or installation. Minor deviations from the drawings required to conform to space conditions and to provide the required accessibility shall be made at no additional cost to Owner.

B. Only base manufacturer's equipment has been investigated and determined to meet necessary space conditions. It shall be the responsibility of the approved equal manufacturer and contractor to verify their suitability for use on this project.

1.05 DRAWINGS

A. The Plans are not intended to show all ductwork, pipes, valves, fittings, connections, and details of the work to be done. The piping, duct, and equipment locations shall be adhered to as closely as possible; however, any changes necessary to avoid columns, beams, lighting fixtures, ductwork, sprinkler piping, etc., shall be made at no additional cost to the Owner.

B. Conflicts in the plans and specifications where changes and alterations are necessary, or where exceptions are taken by the Contractor with regard to sizes, locations, and other details indicated on the drawings, they shall be discussed with the Architect and have his consent in writing before any changes are made. The Contractor shall confer with the Architect for the exact location of all openings into finished areas and all equipment and piping locations before proceeding with the work.

C. The drawings of this work were prepared in conjunction with the other trades and plans of the project and it shall be the Contractor's responsibility to provide himself with drawings of the other trades as required and to coordinate and schedule the work with the other trades.

D. Should any difficulties prevent the installation of the work as indicated, the proposed changes shall be submitted to the Architect in detail and must be approved in writing before the work may be performed.

E. All inverts, locations, and elevations on all piping, equipment, trenches, etc. shall be verified on the job site prior to the performance of any work that may be affected in any manner by said inverts, locations, and elevations. Before construction of project starts, check location of proposed equipment and ductwork. Review other drawings for project, checking locations of structural elements, locations and sizes of chases, type and method of construction of roof, ceilings, walls, and partitions. Report to Architect and Engineers before start of construction any conflicts or unsatisfactory conditions. In no case shall Contractor proceed in uncertainty. No extra charge will be approved after start of construction for work resulting from failure to follow these instructions.
F. Where connections and drains are provided to serve specific pieces of equipment, it shall be the Contractor's responsibility to verify the exact location of the equipment connections and drains and no installation shall be attempted until exact locations have been established. This applies to all equipment regardless of who furnishes said equipment.

1.06 PERMITS, LICENSES, AND FEES

A. The installation of the systems covered by these specifications shall conform in strict accordance to all ordinances, codes and regulations of the State and DHEC and shall conform to all applicable requirements and recommendations of the N.F.P.A. These requirements are the minimum and shall be complied with at no additional cost to the Owner.

B. In the absence of local regulation and codes, on heating, ventilating, or air conditioning, or in items or circumstances not covered by local regulation and codes, all recommendations and requirements of ASHRAE, as set forth in the current editions of the applicable ASHRAE Guides, shall be met as well as all requirements and recommendations of NFPA 90A and the International Building Code.

C. Where requirements of the drawings and specifications exceed code requirements, the work shall be provided in accordance with the drawings and specifications. Any work provided contrary to these requirements shall be removed and replaced at the Contractor's expense

1.07 BID BASIS

A. Basis of Design: The design is based on equipment data furnished by a listed "Base" manufacturer. Only this base listed equipment has been verified by the A/E for compliance with the documents. There is no intent in these documents to necessarily use only "standard" products of the "Base" supplier nor any other supplier. Modifications and alterations of standard products may be required.

1.08 MATERIALS AND WORKMANSHIP

A. All materials and equipment shall be new and free from flaws and defects of any nature. Materials called for are to be considered as standard of quality; which however, implies no right on part of Contractor to substitute other materials and methods without written authority from Architect.

B. All work shall be performed by skilled mechanics, under competent supervision, employing latest and best practices of the trade. Work shall be installed in accordance with recommendations of ASHRAE Guide, and equipment manufacturer's installation instructions. In the event there is any conflict or doubt, consult Architect for clarification and approval.
1.09 SUBSTITUTIONS

A. Specific reference in the specifications to any article, device, product, material, fixture, form or type of construction, etc., by name, make, or catalog number, with or without the words "or equal" shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition, and the Contractor in such cases may at his option, use any article, device, product, material, fixture, form or type of construction, which in the judgement of the Architect, expressed in writing prior to bidding as specified below, is equal to that herein named.

B. Requests for written approval to substitute materials or equipment considered by the Contractor as equal to those specified, shall be submitted for approval to the Architect ten days before bids are taken. Requests shall be accompanied by samples, descriptive literature, and engineering information, as necessary to fully identify and appraise the product. No increase in the contract sum will be considered when requests are not approved. If the item is found to be equal, the Architect will issue an Addendum making it a part of the Contract Documents prior to bidding. After bidding, no further changes will be considered.

C. Contractor shall be responsible for determining that all products submitted for approval meet given space limitations and maintain all required clearances for proper access and service.

D. Being listed as an approved equal manufacturer means only that the listed manufacturer is basically a reputable supplier whose equipment will receive consideration if in accordance with all document requirements including space limitations and deliver. Being listed is not to be construed as indicating or implying that the supplier's product is assured of being acceptable for the project. The burden of developing a product to comply with the documents and of obtaining approval of the product rests solely with the Contractor.

1.10 SUBMITTAL

A. The Engineer will review and take appropriate action on shop drawings, product data, samples, and other submittals required by the Contract Documents. Such review shall be for general compliance with the design and with the information given in the Contract Documents. It shall not include review of quantities, dimensions, weights, fabrication processes, construction methods, coordination with the work of other trades, or construction safety precautions, all of which are the sole responsibility of the Contractor. Engineer's review shall be conducted with reasonable promptness consistent with sound professional practice. Review of a specific item shall not indicate acceptance of an assembly of which the item is a component. The Engineer shall not be required to review and shall not be responsible for any deviation from the Contract Documents not clearly noted by the Contractor, nor shall the Engineer be required to review partial submissions or those for which submissions for correlated items have not been made.
B. Prior to submittal of shop drawings to the Engineer, the General Contractor and the Mechanical Contractor shall review and approve shop drawings. Shop drawings which have not been reviewed and approved in writing by the Mechanical Subcontractor will not be reviewed by the Engineer. Mechanical Contractor shall state in writing on shop drawings, any proposed deviations from contract documents. Such deviations, if not stated in shop drawing submittals, shall be the sole responsibility of the Mechanical Subcontractor. Note: In addition to the General Contractor's approval and stamp, the first page of each shop drawing submittal must contain the words "APPROVED" or "APPROVED AS NOTED" and must be signed and dated by the Mechanical Subcontractor before the Engineer will review them.

C. Review rendered on shop drawings shall not be considered as a guarantee of measurements of building conditions. Where drawings are reviewed, said review does not mean that drawings have been checked in detail; said review does not in any way relieve this contractor from his responsibility or necessity of furnishing material or performing work as required by the contract drawings and specifications.

D. After award of Contract, and before any materials of this Section are delivered to the job site, submit twelve (12) complete sets of Shop Drawings to Architect in accordance with the requirements listed below and in accordance with the provisions of the Architectural Section of these Specifications.

1. After securing tentative approval on all items pending shop drawing submission, the contractor shall submit for approval, in not less than twelve (12) copies, manufacturer's shop drawings of all equipment, and shop drawings to scale of all fabricated work furnished under this Section of the specifications including piping, ductwork, equipment layouts, supports and equipment foundation pad layout. Shop drawings shall be of scale large enough to clearly indicate all details of work. Mechanical rooms, boiler rooms, refrigeration plants, and fan rooms shall be submitted on a scale of not less than 1/4-inch equals one foot.

2. Where colors or finishes are specified for products, a sample showing the color or finish shall be submitted with the shop drawings.

3. Where high efficiency motors have been specified, submit certification of motor efficiency with shop drawings for each motor of one horsepower or greater.

E. Material List: Accompanying the shop drawings, submit a complete list of all materials proposed to be furnished and installed under this Section, giving manufacturer's name and catalog number, sizes, capacities, model numbers, accessories and other pertinent information for each item to indicate full compliance with drawings and specifications; this shall in no way be construed as permitting substitution except as specifically provided in the Architectural Section of these specifications. Every device or piece of equipment herein specified by model and manufacturer shall be submitted for approval. Partial lists submitted from time-to-time will not be permitted.
F. Mechanical/Electrical Coordination: Before equipment is ordered and after all motors, loads, controls, and other characteristics of equipment are known, the Contractor shall review the data shown on the Electrical drawings. Special attention shall be given to motor size, starters, means of disconnect, control wiring, etc. that are being furnished under the electrical section of the specifications. At the time of shop drawing submittal, the contractor shall by letter to the Engineer point out any discrepancies and describe the proposed corrective action.

1. Prior to start of construction, contractor shall submit a starter schedule for review by Engineers. This schedule shall contain equipment description, starter manufacturer and model number, starter accessories, control voltage and source of starter power and control circuitry.

2. No extra charge will be approved after start of construction for work resulting from failure of contractor to follow these instructions.

G. As-Built Drawings: Contractor shall maintain on the job site one complete set of the mechanical drawings for this project. All changes authorized by the Architect as to the location, sizes, etc., of piping, ductwork, and other mechanical equipment shall be indicated in red ink on the mechanical drawings as the work progresses. At the completion of the project, Contractor shall deliver a complete set of "As-Built" prints of the mechanical drawings to the Architect.

H. Control Drawings:

1. Before installation of controls, submit twelve (12) copies of complete submittal data, including equipment specifications, control diagrams, schematic diagrams, internal connections, and sequence of operation to the Architect for his approval. Diagrams shall show all instruments, devices, tubing, etc. Set points and actions of instruments, operating ranges, and normal position of controlled devices shall be indicated. Operating sequence describing each system shall appear on the same drawing as the system's control diagram.

2. Wiring diagrams shall show conduit and wire sizes, transformers, fuses and correct schematic diagrams for each motor starter and magnetic contractor. Diagram shall be coordinated with the equipment manufacturers involved and shall show the terminal designations for all connections to the equipment and the manufacturer's approval obtained.

I. Manual: Upon completion of this portion of the work, and as a condition of its acceptance, deliver to the Owner through the Architect two copies each of a Manual compiled in accordance with the provisions of the Architectural Section of these specifications; and also include in each copy of the Manual a copy of the As-Built Drawings, operating and maintenance instructions, approved control drawings, spare parts lists, name and address of local service representatives and all warranty certificates for new equipment.

1.11 ELECTRIC WORK

A. Electrical Contractor will provide the following for the mechanical equipment:
1. A source of power as required for each electric motor and for each electrical heating and cooling item of equipment installed under the mechanical contract, including final wiring connections to motor terminals or to terminals in a control panel mounted on each respective unit.

2. Circuit breaker protection as required for each electric heating and cooling item of equipment installed under the mechanical contract.

3. Wiring each electric motor and each electrical heating and cooling item of equipment (where applicable) through a magnetic starter or a magnetic contactor furnished by the Mechanical Contractor.

4. Wiring each constant speed ceiling exhaust fan through a wall switch furnished by the Electrical contractor.

B. All motors shall be provided with thermal overload protection either internally or at the starter and all electrical equipment shall be U.L. listed.

C. In the event Mechanical Contractor proposes to use any items of mechanical equipment which have sizes, numbers of electrical meters, or other electrical requirements different from those specified on schedules, drawing or elsewhere, Contractor shall be responsible for coordinating these changes with the Electrical Contractor and he shall reimburse the Electrical Contractor for all additional costs necessitated by these changes.

D. In general, the Electrical Contractor will do all power wiring for the mechanical equipment as described above, and the Mechanical Contractor shall do all control and interlock wiring, unless otherwise specified or indicated on drawings.

E. Consult electrical drawings for extent of electrical work provided for the mechanical equipment. Verify current characteristics with Electrical Contractor before ordering any equipment for this project.

F. Mechanical Contractor shall provide all other wiring not covered above, that is necessary for complete and operating heating and air conditioning systems for the building, including all control wiring, interlock wiring, conduit, relays, controls, starters, disconnect switches, circuit breakers, control conduit and outlet boxes, wiring of all applicable control items of equipment, and other electrical work as required.

G. All wiring shall be run in galvanized or sherardized rigid electrical conduit or E.M.T. where allowed under the electrical section of the specifications, and shall be concealed in finished areas and occupied spaces. All conduit shall be attached to ceiling or walls, attachment to or suspension from other equipment will not be permitted. If routing of conduit is questionable, verify routing with Engineers before proceeding with installation. NO PLENUM RATED CABLE WILL BE ALLOWED ON THIS PROJECT.

H. The Mechanical Contractor shall provide power wiring from the breaker panel to all control devices including but not limited to control panels, valves, thermostats, dampers, flow switches and other devices requiring power for a complete and operating mechanical system.
I. All electrical work required under this Contract shall comply with the National Electrical Code, and shall meet all local requirements. All electric equipment shall bear UL labels.

1.12 GUARANTEES

A. In addition to the warranty and guarantees under the General Conditions of the contract the Contractor agrees:

1. To correct defects in workmanship, new materials, new equipment, and the operation of system for a period of one year from date of acceptance. Equipment and materials, repaired or replaced are guaranteed for one year following date of correction.
2. To repair any damage to building and equipment resulting from defects in workmanship, materials, equipment, and system operation.
3. To remove any item not specified or given approval and replace it with specified or approved item.
4. Any item submitted for approval that does not conform to these specifications shall have accompanying note of exception.
5. That the system as installed shall comply with code requirements.

PART 2 PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. All equipment and materials provided under this section of the specifications shall be new and of the best grade and quality. Materials and equipment manufactured outside of the United States will not be acceptable.

B. The approval of the Architect shall be obtained by the Contractor on all equipment and materials before any installation is made.

C. Equipment that is installed and then does not perform as represented by selection data or shop drawings shall be replaced with equipment that meets the job requirements and specifications at no additional cost to the Owner.

D. All equipment, materials, and work indicated on the drawings or as specified hereinafter is intended to be installed in a manner conforming to the best engineering practices and all equipment is intended to be complete in every respect to satisfy the job requirements and this specification. In the event any material or equipment is indicated to be used or installed contrary to the manufacturer's recommendations, or if any part, control accessory or auxiliary item required for satisfactory and proper operation and performance of the material and/or equipment is not indicated or specified, it shall be the Contractor's responsibility to notify the Architect in writing prior to installation. In the event the Contractor fails to give such notice, he will be required to correct the work and/or furnish items omitted (in the performance of his work) at no increase in the contract sum.
E. Upon request from the Architect, the Contractor shall furnish to the Architect a certification on all materials and equipment so designated by the Architect. The certification shall be made by the manufacturer of the material and/or equipment; shall be signed by an official of the manufacturing concern; and shall state that the drawings, specifications, and project requirements have been thoroughly studied by the manufacturer and that the proposed material and/or equipment is unconditionally guaranteed to operate and/or perform properly as applied.

PART 3 EXECUTION

3.01 UTILITY CONNECTION AND MODIFICATIONS

A. It shall be the Contractor's responsibility to determine all requirements regarding utility services to the building. The Contractor shall verify the exact locations of stubs provided.

3.02 PROTECTION

A. The Contractor shall provide adequate protection to all materials, equipments, fixtures, etc. provided under this section of the specifications to prevent damage of any nature. The Contractor shall be required to remove and replace, at no additional cost to Owner, any item showing any sign of damage of any nature that cannot be restored to its new condition and appearance. Grinding and polishing may be used in the restoration of damaged equipment and materials when approved by the Architect.

3.03 EXCAVATION AND BACKFILLING

A. Contractor shall do all excavating and backfilling for installation of work included under this contract and he shall promptly remove from the premises all excess earth, debris, and trash for which he is responsible. Contractor shall be responsible for coordinating cutting and patching excavation conditions with Owner and Utilities prior to execution of any excavation work. All work shall comply with section 230500 as well as the General Conditions section of these specifications.

3.04 CUTTING AND PATCHING

A. The Contractor will do all cutting and patching and construction of chases within building for this installation.

3.05 PENETRATIONS AND CURBING

A. Contractor shall provide framed openings in roof and walls as required for exhaust fans and louvers. Contractor shall coordinate sizes and locations of these and all other necessary penetrations well in advance.

B. Contractor shall provide all roof curbs for this installation and will flash all roof curbs and penetrations as detailed on drawings.
3.06 MECHANICAL - ELECTRICAL COORDINATION

A. Mechanical equipment, piping, and ductwork shall be installed with clearances to electrical switchboards, panel boards, power panels, motor control centers, and transformers. The clearances shall be the greater of the requirements of the latest editions of the NEC or a minimum of 3'-6" in front of the equipment which ever is greater. Equipment, ductwork or piping shall not be installed directly over the electrical gear and not less than 3'-0" horizontally from the top of the electrical gear.

3.07 OPERATING AND MAINTENANCE INSTRUCTIONS

A. The Contractor shall acquaint and instruct the Owner's representative with all details of performance, operation, and maintenance of the systems. In addition, the contractor shall furnish two copies of a brochure to the Owner through the Architect, which shall contain printed operating and maintenance instructions, parts list, control diagram, etc., including a list of spare parts and any special tools recommended by the equipment manufacturers to be stocked by the Owner. The manuals shall include a complete set of all approved shop drawings furnished under this section of the specifications.

B. The basis of Owner's instructions shall be written for inclusion in the maintenance and operating instructions data specified above. Obtain certificates, signed by the Owner's representative, that these instructions have been received and understood.

3.08 CLEANING

A. The Contractor shall keep the job site clean, removing all debris and unused material as they occur. At the completion of the work, the Contractor shall thoroughly clean all materials and equipment provided as part of the work.

B. Prior to testing and adjusting, all piping systems, including all components of systems, shall be thoroughly cleaned inside and out.

C. All soil, waste, drain and rainwater lines shall be rodded out in the presence of the Architect's representative. All cleanout plugs shall be removed, lubricated and replaced.

D. All piping shall be chemically cleaned prior to final filling and connection to chiller and air handlers.

E. Painting of the mechanical equipment shall be as specified under other sections of the work. Removing loose scale, rust, drippings, dirt, etc. in preparation for painting shall be done under this section of the specifications.

F. Prior to acceptance of the building, thoroughly clean all exposed portions of the HVAC installation, removing all labels and all traces of foreign substances, using only a cleaning solution approved by the manufacturer of the item being cleaned. Caution should be taken to avoid damage to all finished surfaces.
3.09 START-UP

A. The Contractor shall place the systems in full operation before testing begins. Contractor shall make corrections in the system, including furnishing and installing drives, motors, dampers, valves, etc., if required to balance the systems. All such corrections shall be included in the Contractor's base bid and shall be accomplished at no additional cost to the Owner. All piping shall be tested before covered with insulation or being concealed.

END OF SECTION
SECTION 23 03 00
PRESSURE TESTING

PART 1 GENERAL

1.01 DESCRIPTION

A. The work in this section includes the pressure testing of all air conditioning systems and includes requirements common to all the mechanical systems. Provide all labor, tools instruments, etc. as required to completely test the systems.

B. Other sections of these specifications are a part of this section. Refer to all other sections for a complete description of the work. Work, conditions, and materials specified in other sections and not duplicated in this section includes, but is not limited to the following:

1. Mechanical General Provisions
2. Basic Materials and Methods
3. Refrigeration
4. Adjusting Balancing HVAC Systems

C. All work provided under these specifications shall be subject to constant inspection and final approval of the Architect and all Code authorities having jurisdiction. Tests, in addition to these specified herein, required to prove Code compliance shall be provided as required by the Authorities without additional cost to the Owner. All work found to be defective or indicating leakage shall be repaired or replaced with new materials, as directed by the Architect. Tests shall be repeated until all work is proven tight.

1.02 QUALITY CONTROL

A. All tests shall be conducted by qualified personnel. When requested the qualifications of individuals shall be submitted to the Architect for approval.

1.03 NOTIFICATION

A. The Architect/Engineer shall be notified prior to all tests.

B. The Code Authorities having jurisdiction shall be notified prior to all tests.

PART 2 PRODUCTS

2.01 PROVIDING EQUIPMENT

A. Provide all material, test equipment, instruments, and labor required for the tests. All instruments shall be properly calibrated and shall have records on calibration.
PART 3 EXECUTION

3.01 PIPE TEST
A. All water piping shall be proven tight by a hydrostatic pressure test of 1-1/2 times the normal working pressure of the system, but in no case less than 200 psig for a period of not less than 24 hours. The piping shall hold the pressure without change except that change due to temperature change. This test is to be witnessed by Engineer and Owner.

3.02 EQUIPMENT TEST
A. Equipment in the piping system shall be subjected to hydrostatic pressure tests equal to the maximum non-shock working pressure of the equipment and shall hold the pressure for not less than 4 hours.

3.03 REFRIGERANT PIPING PRESSURE TESTING
A. After Freon piping has been completed and before insulating pipe and enclosing chases, the field installed piping shall be pressure tested at a pressure of 300 psi (high side) and 150 psi (low side). While the system is being pressure tested, an electronic leak detector shall be used to check for leaks.

B. Pressure shall be maintained on piping for a minimum of 12 hours. All field installed piping shall be evacuated when surrounding ambient air is not less than 60 degrees F. A minimum vacuum of 2.0 mm of mercury shall be pulled on piping system and maintained for 12 hours. The vacuum pressure displacement shall be not less than 5 CFM. The vacuum shall be checked with an electronic gauge.

END OF SECTION
SECTION 23 05 00

BASIC MATERIALS AND METHODS

PART 1 GENERAL

1.01 DESCRIPTION

A. Work described in this section includes construction materials and methods of installing equipment common to all mechanical systems. Provisions of the section apply to all mechanical specifications sections.

B. Mechanical General Provisions apply to work specified in this section.

PART 2 PRODUCTS AND METHODS

2.01 FLASHING

A. Ductwork and HVAC Equipment: Cap flashing for all ducts and other types of ventilating equipment which pass through or mount on the roof shall be furnished and installed under this section of the specifications. The material shall be of the same materials as the ducts, etc. to which it shall be fastened unless otherwise noted. The cap flashing shall be made tight to the duct, waterproofed, and extended over the base flashing and down the side for not less than 4 inches. The cap flashing shall be formed to provide a spring action against the base flashings. In cases of dissimilar metals between the cap and base flashings, an isolation membrane shall be installed to prevent electrolysis.

B. Flashing for pipes passing through the roof shall be provided as indicated on the drawings or as approved by the Architect.

2.02 PIPE SLEEVES

A. All pipes passing through walls, floors, ceilings, all fire rated partitions, etc. shall be provided with pipe sleeves made of galvanized steel pipe unless specifically noted otherwise. Sleeves through partitions and walls shall be of the same length as the wall thickness. Sleeves set in concrete slabs shall be set flush with the underside of the slab and shall extend 1/2 inch above the finish on top of the slab. Where sleeves are in fire rated construction, the voids between the sleeves and the piping passing through insulated piping shall be of sufficient size to allow insulation to pass through the sleeve freely. Where pipes pass through walls below grade or through any floor slabs, the space between the pipe and sleeve shall be finished caulked water tight with G.E. Silicone caulking.

B. At the Contractor's option sleeves 8 inches in diameter and larger may be formed of 16 gauge galvanized steel with welded butt joints. The metal finish shall be restored after welding.
2.03 FIRESTOPPING MATERIALS

A. Where pipe, ducts, conduit, wiring, or other mechanical equipment passes through fire rated walls, floors, or partitions with ratings of one-hour or greater, firestopping materials shall be placed in the voids between the equipment and the rated building material. Sleeves in rated construction shall have voids between sleeves and duct or pipe filled with firestopping materials.

B. Firestopping Materials shall have a fire rating equal to or greater than the construction penetrated. Firestopping material shall not produce toxic smoke when exposed to flame. Firestopping shall be unaffected by vibration, normal usage, and shall not deteriorate with time.

C. Firestopping materials shall be Chase-Foam as manufactured by Chase Technology Corp. or Silicone RTV Foam (3-6548 Silicone) as manufactured by Dow Corning or 3M "CP-25" caulk system. Where permitted by Code, fire rated mineral wool may be used for applications approved by the Architect. All fire stopping systems shall be installed in strict compliance with manufacturer's instructions for compliance with UL listings.

D. Firestopping in the mechanical room [and elevator machine room] shall be recessed 3/4-inch on both sides and shall be sealed on both sides with 3/4-inch of acoustical sealant.

2.04 PENETRATIONS AND CURBING

A. Contractor shall provide framed openings in roof and walls as required for exhaust fans and louvers. Contractor shall coordinate sizes and locations of these and all other necessary penetrations with existing structural elements well in advance performing cutting and placement of curbs. Contractor shall advise Owner and Engineers of any conflicts prior to proceeding with work.

B. Contractor shall provide all roof curbs for this installation and will flash all roof curbs and penetrations as detailed on drawings.

C. Contractor shall provide all roof equipment support rails for this installation and will flash all support rails and penetrations as detailed on drawings.

D. Curbs shall be seismically rated welded galvanized steel construction minimum 18 ga. with wood nailer, 1-1/2" rigid insulation on interior, counter flashing cap, and damper shelf as required. Unless specified elsewhere curbs shall be a minimum of 12" high with interior dimensions as required by unit dimensions. Curbs shall be Creative Metals, Inc. Series CSSF, Conn-Fab, Superior Metals, or approved equal. Curbs shall be compatible roof system. Verify roof construction and pitch prior to ordering curbs. Provisions shall be made within curbing penetrations for routing of power wiring and control wiring to equipment to prevent the necessity of a second roof penetration for this purpose.
E. Equipment Support Rails shall be welded galvanized steel construction minimum 18 ga. with wood nailer, 1-1/2" rigid insulation on interior, counter flashing cap, and damper shelf as required. Unless specified elsewhere curbs shall be a minimum of 12" high with interior dimensions as required by unit dimensions. Curbs shall be Creative Metals, Inc. Series ESSSF, Conn-Fab, Superior Metals, or approved equal. Support Rails shall be compatible roof system. Verify roof construction and pitch prior to ordering rails.

F. Where walls are penetrated for louvers, ducts, or vents, appropriate lintels shall be provided to support structure and shall comply with the requirements of the structural drawings and specifications.

2.05 FLOOR, WALL AND CEILING PLATES

A. General:

1. Where exposed to view, all piping or duct passing through or into floors, walls, partitions, and ceilings shall be provided with escutcheon plates of flanges. The Plates or flanges shall fit snugly around the pipe, or the pipe insulation for insulated lines, and shall cover completely the pipe opening and sleeves. Plates shall be fabricated of minimum 16 gauge galvanneal as appropriate to allow field painting. All plates shall be painted to match surrounding finish.

B. Unfinished Areas:

1. In unfinished areas, the plates or flanges shall be constructed of not less than 16 gauge galvanized sheet metal. Equipment rooms with furred ceilings will be considered as unfinished areas.

2.06 ACCESS PANELS

A. Access panels shall be provided for access to all equipment, valves, piping, dampers, etc. furnished under this section of the specifications and requiring access. Dampers with operating control through the ceiling will not require access. The panels shall be located as indicated on the drawings and/or as required for adequate access. The exact locations of the access panels shall be as approved by the Architect.

B. Walls and Ceilings: Furnish and install steel doors in sidewalls, in walls of chases, in inaccessible ceiling, and other locations as indicated or required for ready access to service valves, balancing valves, automatic air vents, balancing dampers, and other items as applicable. Access doors shall be a minimum of 24" x 24" in size where applicable, and shall be furnished with screwdriver operated cam lock doors and a gray prime coat finish. Access doors shall have the same fire rating as the walls, floors, or ceilings in which they are installed. Access doors shall be Miami-Carey Co. Model HP and (as applicable) or approved equal.

C. All panels located in fire rated walls or partitions shall be 1-1/2 hour B rated doors.
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D. Ductwork: Furnish and install steel access doors where indicated and/or required for access to motor operated dampers, controls, filters, louvers, fire dampers, and any other operable devices. Access doors shall be minimum 18" x 18" in size and shall be fabricated of minimum 24 gauge galvanized steel hinged to a fastening device to give an air tight closure on neoprene or felt gasket. Doors for insulated duct shall be double panel construction with 1" rigid insulation material between metal panels. Access doors shall be Ruskin AD-1275, Series ADH-22 or approved equal.

E. Suppliers of Comparable Products: Krueger, Miami-Carey, Ruskin.

2.07 PAINTING

A. All factory applied finishes on equipment and materials that are damaged in any fashion shall be restored to their original finish in a manner as approved by the Architect.

B. Where the Interior of any duct is exposed to view or can reflect light as viewed from a habitable space the interior surfaces shall be primed and painted flat black or as otherwise approved by the Architect.

C. Where colors or finishes are specified in this section of the specifications to match adjacent surfaces and the colors or finishes of the product installed do not match the contractor shall repaint or refinish as required to accomplish the desired effect, as approved by the Architect.

D. All finish painting shall be performed under another section of the specification, except as specified otherwise in this section of the specification.

E. Contractor shall paint all exposed piping, both insulated and uninsulated that is installed under his contract.

2.08 EXCAVATION AND BACKFILLING

A. The Contractor shall carefully plan the excavations to avoid existing trees and plants and shall not approach too close to footings and foundation. Exact locations of excavations to be approved by the Architect before performing work. The excavation shall be only wide and deep enough to provide for the piping, and other subgrade construction. Shoring shall be provided and used when the ground and/or the depth of the excavation warrants same.

B. The piping shall rest on a continuous and firm grade. Holes shall be cut in the bottom of the excavation for pipe bells.

C. Where rock is encountered the rock shall be removed to a depth of 6" below the desired depth and replaced with suitable earth.
D. Backfilling shall be started only after the piping has been completed, tested and inspected. The backfill shall be free of rocks and debris and shall compacted as the excavation is filled. The Contractor shall take ample precaution to prevent damage to the piping. The compaction of the backfill shall be the same as the adjacent area as approved by the Architect, unless otherwise indicated.

2.09 OUTDOOR UNIT SUPPORTS

A. Units on roof: Contractor shall provide equipment support rails for each outdoor unit located on roof. Equipment support rail shall be as specified here-in. Contractor shall coordinate support rail placement to insure proper support and installation.

2.10 STRUCTURAL ATTACHMENTS

A. Concrete fasteners shall be self-drilling type, Locke Mfg. Co. "Bull Dog", Phillips "Red Head", or Diamond "Blue-Cut".

B. Contractor shall provide all supplementary steel, framing members, beam clamps, hanger rods, etc., as required to properly support equipment and ductwork.

C. Hanger rods shall be selected to safely carry the load to be supported and shall not be less than the diameter listed by the hanger manufacturers for the specific size hanger used.

D. Attachment:

1. Piping and equipment suspended from steel construction shall be suspended from beams from the panel points of the bar joist only. When the hanger point is not directly below a structural member of a joist panel point, supplementary supporting steel shall be provided to receive the bridge across the structural member of a joist as required to receive the hanger. The hangers and supporting steel shall not be attached to the roof deck construction.

2. Hangers and supporting steel shall be attached to new concrete construction with continuous metal inserts designed to be used in ceilings, walls, or floors. In no case shall the load imposed on an insert exceed the manufacturer's recommended loading.

3. Hangers and supporting steel shall be attached to existing concrete structure, using concrete drill anchors at location and in a manner as approved by the Architect. Anchors shall not be loaded beyond their published ratings.

E. Support ducts from building structure with galvanized steel hangers to each side of duct. Hangers for ducts up to 60 inches maximum side dimension shall be 1" X 1/8" galvanized steel band. Hangers for larger ducts shall be 1-3/8" X 1/8" galvanized steel band. Space hangers on 8 foot centers with three hangers at each branch or take-off.

F. Steel pipe passing through a concrete slab on grade shall have modular expanding seals between pipe and sleeve. "Link-Seal" or an approved equal.
2.11 FOUNDATIONS, HANGERS, AND SUPPORTS

A. The Contractor shall provide all necessary hangers, supports, bracing, accessories, etc. required for proper installation of the work. Pipe hangers shall be spaced close enough to maintain proper grade and prevent sagging, but in no case shall the hanger spacing be greater than specified hereinafter. Special care shall be taken in supporting piping subject to expansion and contraction so that the piping does not become improperly aligned or anchored.

B. Unless specifically indicated otherwise, all concrete foundations and all structural steel, other than the building structure or special supports provided under another section of the specifications, required for proper support of piping, equipment, and materials provided under this section of the specifications and shall be furnished and installed under this section of the specifications and shall comply in strict accordance with all requirements of the Structural and/or Concrete Sections.

C. All supplementary steel exposed to the weather shall be hot-dipped galvanized.

D. Unless otherwise indicated, all floor mounted equipment located in the Equipment Room and spaces shall be mounted on 4" high concrete bases extending 6" beyond the bases of the equipment in each direction. Concrete shall be reinforced with No. 4 steel rods spaced 12" on center in both directions, except that steel in pump bases shall be on 6" centers.

2.12 ELECTRICAL

A. All motors required for all equipment furnished under this section of the specifications shall be provided under this section of the work. Two speed motors shall be two winding type unless otherwise indicated. Unless otherwise indicated under the Electrical work or on the Mechanical Drawing, motors smaller than 1/2 HP shall be for 115 volts, single phase, 60 cycle power, and motors 1/2 HP and larger shall be single or three phase 60 cycle power as indicated on equipment schedules.

B. All motor starters, both manual and magnetic, and pushbutton stations required for motors furnished under this section of the specifications shall be provided under this section of the work unless specifically noted or indicated or otherwise in the Electrical section. All starters shall have "HAND-OFF-ON" switches and auxiliary contactors. Control transformers shall be provided as needed to meet control requirements. All two-speed starters shall be for two winding motors and shall have decelerating relay between high speed and low speed. All starters shall have compelling low speed start relay. All starters shall be installed under the Electrical Section of the specifications, unless furnished as an integral part of the equipment. All starters shall be of the same manufacturer as the starters furnished under the Electrical Section, except starters for water chillers may be of a different manufacturer. Coordinate with the Electrical Section.
C. Motors one horsepower and larger, including those used for pumps, air units, fans, etc. shall be designed in accordance with NEMA Standard MGI, Design B, Class B or F insulation for 40 degrees C temperature rise. The motor power factor at full load and rated voltage for motors with greater than 1 HP output shall be at least 0.85. Power factor shall be as determined by IEEE Standard 112A Method B. Apparent efficiency (Nominal Efficiency x Power Factory = Apparent Efficiency) shall meet or exceed the ASHRAE 90 energy standards. All motor applied with VFDs shall be inverter duty rated and provided with shaft grounding brushes and shall be earth grounded.

D. All power wiring shall be provided under the Electrical Section of the specifications, unless specifically noted otherwise in this section of the work. Power wiring between starters and applied equipment motors shall be provided under the Electrical Section. Power wiring that is furnished under the Electrical Section to Packaged Equipment such as rooftop units, condensing units, electric heating equipment, packaged house pumping systems, etc. shall consist of a single point connection and shall terminate with the connection to the units shall be furnished as part of the package or shall be furnished under the Mechanical Section of the work.

E. All electrical devices and equipment including, but not limited to, all motors, starters, relays, pushbuttons, wiring, etc. provided under this section of the work shall comply in all respects with all requirements of the Electrical Section of the Specifications. Refer to the Electrical drawings for the project to determine the extent of Electrical wiring provided for support of Mechanical systems. All miscellaneous power wiring and all control wiring not indicated on Electrical drawings shall be provided by the Mechanical Contractor as part of Division 23 scope.

F. Identification labels shall be provided for each starter, control device, etc. showing the instruments function. Labels shall be in accordance with the requirements for labels as specified under the Electrical Section of the specifications.

G. All control wiring shall be provided under this section of the work, unless specifically indicated otherwise under the Electrical Section of the specifications.

H. Each manufacturer shall certify in writing to the Engineer that the equipment furnished has high efficiency motors as specified hereinbefore. The certification shall state motor HP, motor manufacturer, power factory and efficiency.

END OF SECTION
SECTION 23 05 03

PIPE & PIPE FITTINGS

PART 1 GENERAL

1.01 The work under this section includes furnishing and installing all pipe and fittings required for the project.

1.02 Refer to other sections for all additional pipe and fittings specifications:

A. Refrigerant Piping
B. Valves
C. Pressure Testing

PART 2 PRODUCTS

2.01 CHILLED WATER and HOT WATER PIPING

A. Piping: Unless otherwise indicated, shall be Schedule 40 black steel seamless or E.R.W. conforming to ASTM A-106 or A-53. Assemble piping 2” and smaller with 150 psig malleable iron screw fittings and piping larger than 2” with standard wall schedule 40 weld fittings or mechanical couplings. In addition to ASTM standards, all piping and fittings shall be domestic manufacture only.

B. Drains: Unless otherwise indicated, drains from mechanical equipment including unit condensate drains and equipment room drains shall be type "M" hard drawn copper tubing conforming to ASTM A-88, assembled using long radius pattern wrought copper solder fittings.

C. Relief Valve Discharge Lines: Piping shall be the same as specified for the medium being relieved, unless otherwise indicated.

2.02 Deleted

2.03 PIPE FITTINGS

A. Copper Pipe: Wrought copper, solder type fittings, suitable for the temperature and pressures to be encountered and for the solder or brazing specified. Els shall be long radius pattern. Flare connections to equipment will be allowed only where required. Unions shall be Nibco No. 633 wrought copper with copper-to-copper solder joints.

B. Steel and Iron Alloy Pipe (Screw Fittings):

1. Unless otherwise indicated, fittings shall be malleable iron in accordance with American Standard for Malleable Iron Screwed Fittings. Fittings shall be black or galvanized to match piping.
2. Eccentric reducing fittings shall be cast iron, black or galvanized to match piping. Screwed fittings used in drainage piping shall be cast iron, drainage pattern fittings.

3. Unions in steel alloy piping shall be Grinnell Fig. 463, ground joint bronze-to-iron-unions.

C. Steel and Iron Allow Pipe (Weld Fittings):

1. Fittings and rings shall be "Tube Turns", or approved equal by Taylor Forge or Ladish.

2. Steel butt fittings shall be in accordance with ASTM A-234 and ASA B16, Material A-106, Grade B. All elbows shall be long radius fittings.

3. Weldolet or Threadolet Fittings will be acceptable only when the branch size take-off is not less than two sizes smaller than the main run of pipe.

4. Unions shall be welding neck or slip-on companion flanges.

D. Steel Pipe (Mechanical Fittings)(Allowed above grade in mechanical room only):

1. Couplings shall be malleable iron for use with grooved and pipe, complete with bolts and gaskets. Gaskets shall be suitable for the temperature, pressures, and services to be encountered as recommended by the manufacturer for the specific installation. Couplings shall be Victaulic Style 77, Style, Style HP 70 or Style HP 70 ES as indicated.

2. Fittings shall be "Full-flow" design, fabricated of malleable iron, black or galvanized to match piping, and shall be grooved end.


E. SILVER SOLDER shall be Sil-Phos as manufactured by United Wire, or an approved equal high temperature solder.

F. GASKETS shall be as recommended by the manufacturer for the service, temperatures and pressures to be encountered.

G. Pipe Joints:

1. Copper Pipe & Tubing: Copper joints shall be made with a wire type solder applied in accordance with the manufacturer's recommendations. No paste solder or flux solder will be allowed. Copper joints underground, under floors on grade, or concealed in chases shall be brazed with silver solder. Copper joints exposed above the floors on grade or readily accessible above removable ceilings shall be made with 95-5 wire solder or brazed with silver solder. Connections of copper to ferrous piping or equipment shall be made with dielectric couplings and proper adapters. Solder joints at valves shall be made with 95-5 solder only. Flare connections to equipment will be allowed where required. Ends of all pipe and tubing shall be cut square and reamed smooth. Ends of tubing and pipe and cups of fittings shall be cleaned of oxides by mechanical means and lightly fluxed as soon as possible with a non-corrosive paste type flux. When inserting pipe or tubing into fitting a slight twisting motion shall be applied to spread flux.
2. Steel and Iron Allow Piping: All piping connections to and near all coils and equipment, regardless of size, shall be screwed joints except when the equipment requires a flanged connection. Sufficient screwed fittings shall be provided near connection points to equipment to absorb piping movement without putting stress on equipment connection.

3. Screw Joints: Joints shall have American Standard tapered pipe threaded properly formed. Joint compound consisting of graphite and oil may be used in making up joints. Joint compounds containing lead or lead oxides shall not be used. All pipe shall be cut square, reamed, threaded and thoroughly cleaned before installation.

4. Welded Joints:
   a. All piping systems or portions of systems containing welded joints shall be constructed in accordance with all provisions and recommendations of ANSI B31.1, current edition, except as modified herein.
   b. Butt weld joints shall be complete full penetration welds made with a single vee, double vee, or other suitable type of groove, and shall be made with backing rings.
   c. The Contractor shall verify in writing to the Owner prior to construction that all welding procedures, welding operators and welders to be used on this project are qualified in accordance with Section IX of the ASME Boiler and Pressure Vessel Code, current edition.
   d. A copy of each welder's or welding operator's qualification record shall be filed in the job office.
   e. All welds shall be clean and shall be free of "icicles", loose metal or other obstructions that result from welding.
   f. The Architect reserves the right to require the Contractor to cut open the pipe along side of any welds for the purpose of inspection. In each case, the Owner will pay for such cutting and rewelding if the work is correct, but in case the inspected work is incorrect, the Contractor shall bear the cost of cutting, inspecting, and rewelding.
   g. The types and extent of non-destructive examinations required for pipe welds shall be in accordance with ANSI Code for Pressure Piping, B31.1 - Power Piping.

5. Mechanical Joints: Pipe ends shall be square cut and reamed of any burrs. Clean, sharp grooves shall be cut into pipe and the mechanical couplings and fittings shall be installed in strict accordance with the manufacturer's recommendations.

2.04 PIPE HANGERS AND SUPPORTS

A. The contractor shall furnish all labor, materials, equipment and incidentals and install pipe hangers, supports, concrete inserts, and anchor bolts including all metallic hanging and supporting devices for all piping. Pipe hangers shall meet the seismic requirements outlined in Section 230548.
B. Hangers and supports shall be of approved standard design where possible and shall be adequate to maintain the supported load in proper position under all operating conditions. The minimum working factor of safety for pipe supports shall be five (5) times the ultimate strength of the support. All pipe and appurtenances connected to equipment shall be supported in such a manner as to prevent any strain being imposed on the equipment. When manufacturers have indicated requirements that piping loads shall not be transmitted to their equipment, the contractor shall submit a certification stating that such requirements have been complied with.

C. Submit to the Engineer for approval shop drawings of all items to be furnished under this section.

D. Submit to the Engineer samples of all materials specified herein if requested. All pipe and tubing shall be supported as required to prevent significant stresses in the pipe or tubing material, valves, and fittings and to support and secure the pipe in the intended position and alignment. All supports shall be designed to adequately secure the pipe against excessive dislocation due to thermal expansion and contraction, internal flow forces, and all probable external forces such as equipment, pipe and personnel contact.

E. All materials used in manufacturing hangers and supports shall be capable of meeting the respective ASTM Standard Specifications with regard to tests and physical and chemical properties, and be in accordance with MSS SP-58.

F. Hangers and supports shall be spaced in accordance with MSS SP-69 Table 3.

G. Pipe hangers and supports shall be as manufactured by B-Line Systems, Inc. or equal by PHD, Grinnell, or Fee and Mason. Any reference to a specific figure number of a specific manufacturer is for the purpose of establishing a type and quality of product shall not be considered as proprietary. Any item comparable in type, style, quality, design and performance will be considered for approval.

H. Hanger rods, nuts, and bolts shall be cadmium plated in mechanical rooms and elsewhere where exposed. Hardware concealed above ceilings may be standard black steel.

I. Supports outside of building shall be galvanized construction.

J. Pipe Hangers and Supports for Metal Pipe:

1. Suspended single pipes shall be supported by hangers suspended by steel rods from galvanized concrete inserts, beam clamps, or ceiling mounting bolts as follows:

K. Hangers:

1. All hangers and supports shall have some form of adjustment available after installation. Hanger material shall be compatible with the pipe material.

2. Hangers for steel pipe shall be B-Line Systems, Inc. figures B3100, B3102, B3170, and B3173 or equal. B-Line Systems, Inc. figures B3174 and B3198 or equal are acceptable for use on piping 2 inch and smaller.
3. Hangers for copper tubing shall be B-Line Systems, Inc. figures B3104CT, B3170CT, B3173CT, and B3198CT or equal. Felt isolator pads may be used on carbon steel hangers supporting stainless steel pipe or copper tubing.

4. Piping hangers shall be installed around the outside of the insulation with protective shields. Vapor barrier jackets shall not be broken by hanger rods.

5. Support long horizontal runs of insulated steel piping subject to 1/2" or more longitudinal thermal expansion with B-Line Systems, Inc., figures B3110 or B3114 roller hangers with a figure B3160 series protection saddle or equal. Cast iron rollers shall not be subjected to temperatures above 450 F.

L. Hanger Rods:

1. Hanger rods shall be B-Line Systems, Inc. figures B3205 and ATR or equal.
2. Hanger rods shall be subjected to tension only. Lateral and axial movement shall be accommodated by proper linkage in the rod assemble.
3. Hanger rod diameters shall be based on MSS SP-69 Table 4.

M. Concrete Inserts:

1. Concrete inserts for pipe hangers shall be continuous metal inserts designed to be used in ceilings, walls, or floors, spot inserts for individual pipe hangers and shall be as manufactured by B-Line Systems, Inc. or equal and shall be as follows:
   a. Continuous concrete inserts shall be used where applicable and shall be used for hanger rod sizes up to and including 3/4" diameter. Inserts to be used where supports are parallel to the main slab reinforcement shall be B221, B321, or B521 by B-Line Systems, Inc. or equal.
   b. Spot concrete inserts shall be used where applicable and shall be used for hanger sizes up to and including 7/8" diameter. Inserts shall be figures B2505 thru B2508, B2500, or B3014 by B-Line Systems, Inc. or equal.

N. Welded Steel Brackets:

1. Wall or column supported pipes shall be supported by welded steel brackets equal to B-Line Systems, Inc. figures B3063, B3066, and B3067 or equal as required for pipe sizes up to and including 20" diameter.

O. Stanchions:

1. Floor supported pipes 3" and larger in diameter shall be supported by either cast-in-place concrete supports or adjustable pipe saddle supports as directed by the Engineer. In general, concrete supports shall be used when lateral displacement of the pipes is probable (unless lateral support is provided), and adjustable pipe saddle type supports shall be used where lateral displacement of the pipes is not probable.
2. Each adjustable pipe saddle support shall be screwed or welded to the corresponding size base stand. Supporting pipe shall be of schedule 40 steel pipe construction. Each base stand shall be secured to the concrete floor by expansion bolts. Adjustable saddle supports shall be equal to B-Line Systems, Inc. figure B3093 with B3088T or B3090 with B3088.
P. Riser Clamps:

1. Riser piping shall be supported independently of any connected horizontal piping of possible. Provide supplementary steel or concrete supports for clamps. The clamps shall not be supported by the sleeves.

2. Support all vertical runs of ambient piping at each floor or as specified with B-Line Systems, Inc. figures B3373, B3131, B3373CT as required or equal.

Q. Pipe Clamps:

1. Where flexibility in the hanger assembly is required due to horizontal pipe movement, use pipe clamps. For non-insulated pipe use B-Line Systems, Inc. figures B3140 or B3142 or equal. For insulated pipe use B-Line Systems, Inc. figures B3144 or B3146 or equal.

R. Trapeze Hangers:

1. Strut channel trapeze hangers shall be used to support parallel piping. Pipe racks or stanchions fabricated with strut channel shall be used in areas of multiple pipe runs. Strut clamps, straps, and rollers will be used to maintain proper alignment. Strut shall be B22 or heavier as required as manufactured by B-Line systems, Inc. or equal. Clamps and straps shall be B2000 series or B2400 series by B-Line Systems, Inc. or equal. Rollers shall be B-Line Systems, Inc. figures B218, B219, B379, B479, or B3126 or equal.

S. Saddles:

1. Pipe covering protection saddles shall be used in conjunction with all insulated cold pipe lines. All saddles shall be centered on the piping and in the hangers.

2. Saddles for all insulated piping shall be galvanized sheet metal saddle shields of adequate size to cover the bottom 120 degrees of the pipe insulation. The shields shall be properly curved to evenly contact the outside circumference of the insulation and shall have rounded corners (1/2" radius). The length of the shields shall be as recommended by the pipe insulation manufacturer for the pipe size, insulation thickness and hanger spacing, but in shields shall be constructed of sheet metal of gauges not less than that listed below:

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Min. Gauge</th>
<th>Min. Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up thru 3&quot;</td>
<td>18 gauge</td>
<td>12&quot; long</td>
</tr>
<tr>
<td>3-1/2 thru 5&quot;</td>
<td>16 gauge</td>
<td>16&quot; long</td>
</tr>
<tr>
<td>6&quot; and 8&quot;</td>
<td>14 gauge</td>
<td>20&quot; long</td>
</tr>
<tr>
<td>10&quot; and 12&quot;</td>
<td>12 gauge</td>
<td>24&quot; long</td>
</tr>
</tbody>
</table>

2.05 IDENTIFICATION OF PIPING

A. Label all piping in Equipment Rooms, above "Lay-In" type ceilings and all other accessible locations. Pipe markers shall conform with Scheme for Identification of Piping Systems (ANSI A13.1-1956).
B. Each marker shall show the name of the fluid in the pipe and a directional flow arrow, both superimposed on one of the five basic background colors. Pipe markers shall be installed at each service valve, at each mechanical item of equipment, at 20 foot intervals on horizontal runs of piping, and at midpoints of risers on vertical piping.

C. The identifiers shall be plastic strips on which the name of the service shall be printed. The identifiers shall be installed with an adhesive which will adhere to the pipe or insulation without deteriorating. Each piping system shall have a different color code marking. Colors shall be submitted for approval. Identification markers shall be applied over the insulation on insulated pipe. The identifiers shall be Brady or Seton self-sticking pipe markers and combination arrow tape meeting the requirements of ANSI standards. Where approved by Engineers stenciled labeling may be accepted.

2.06 ELECTRIC HEATING CABLE

A. General: Furnish and install a complete UL listed system of heaters, components, and controls to prevent pipelines from freezing. Apply heat tracing to all water piping above grade outside of building.

B. The self-regulating heater shall consist of two (2) 16 AWG nickel coated copper bus wires embedded in parallel in a self regulating polymer core that varies its power output to respond to temperature all along its length, allowing the heater to be crossed over itself without over heating, to be used directly on plastic pipe, and to be cut to length in the field. The heater shall be covered by a radiation cross linked modified polyolefin dielectric jacket.

C. In order to provide energy conservation and to prevent overheating, the heater shall have a self regulating factor of at least 90 percent. The self regulation factor is defined as the percentage reduction, without thermostatic control, of the heater output going from 40 degrees F pipe temperature operation to 150 degrees F pipe temperature operation.

D. The heater shall operate on line voltages of 120 volts without the use of transformers.

E. The heater shall be sized according to this table. The required heater output rating is in watts per foot at 50 degrees F. (Heater selections based on 1" fiberglass insulation on metal piping).

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Minimum Ambient Temperatures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-10 degrees F</td>
</tr>
<tr>
<td>3 inch of less</td>
<td>5 watt</td>
</tr>
<tr>
<td>4 inch</td>
<td>5 watt</td>
</tr>
<tr>
<td>6 inch</td>
<td>8 watt</td>
</tr>
<tr>
<td>8 inch</td>
<td>2 strips-5 watt</td>
</tr>
<tr>
<td>12 inch to 14 inch</td>
<td>2 strips-8 watt</td>
</tr>
</tbody>
</table>

F. The heater shall be XL-Trace as manufactured by Raychem Corporation.

G. Power connection, end seal, splice and tee kit components shall be applied in the field.
H. The system shall be controlled by an ambient sensing thermostat (AMC-1A) set at 40 degrees F either directly or through an appropriate contactor.

I. Ground fault circuit breaker shall be provided as required by section 427-22 of the NEC-2008.

J. Installation:
   1. Apply the heater linearly on the pipe after piping has been successfully pressure tested. Secure the heater to piping with cable ties or fiberglass tape.
   2. Apply "electric traced" signs to the outside of the thermal insulation.

K. After installation and before and after installing the thermal insulation, subject heat to testing using a 2500 VDC megger. Minimum insulation resistance should be 20 megohms regardless of length.

L. The installer shall test for both heating cable bus wires to verify the connection of any splices or tees.


2.07 WATER TREATMENT SYSTEM

A. Provide a pot type chemical feeder for each water system. Unit shall be piped as detailed on drawings. Where no detail is shown on drawings, pipe pot feeder as recommended by chemical treatment vendor and provide isolation ball valves on entering and leaving side of feeder.

B. After final flushing and cleaning of loop water piping, provide a permanent corrosion inhibitor. The permanent treatment shall be designed to prevent corrosion, inhibit rust, and prevent microbiological and bacterial growth in the closed loop system. In addition to the quantity of chemical required to initially treat the system, the contract sum shall include a one year maintenance contract to include monthly sample analysis, labor, and chemical to maintain system chemicals at the proper levels. Provide monthly reports to owner.

PART 3 EXECUTION

3.01 PIPING shall be installed and connected to the equipment essentially as indicated on the drawings, in a neat and workmanlike manner. Unless specifically noted otherwise, all piping shall be concealed above ceilings and in chases.

3.02 ALL PIPING and equipment shall be supported by the building structure. Unless specifically noted otherwise, no piping or equipment shall be supported from ductwork, other piping, plenum construction or other equipment.
3.03 ALL PIPING shall be installed and arranged to allow free movement to the piping due to expansion, contraction, building movement, etc. without putting excessive stress or strain into the piping or equipment. All piping, risers, run-outs, etc. subject to deflection by expansion and contraction shall be cold-sprung 50% of the deflection required to be absorbed. All sleeves and other openings in the construction shall be of sufficient size and spaced so as to allow for the necessary pipe movement without undue stress on piping. Risers shall be free to travel as required with the horizontal piping. Piping run-outs to and from risers shall be absorbed and still maintain the specified pitch for the run-outs and piping to and from the risers.

3.04 PIPING and equipment suspended from steel construction shall be suspended from beams or from the panel points of the bar joist only. When the hanger point is not directly below a structural member or a joist panel point, supplementary supporting steel shall be provided across the structural members or bridge joists as required to receive the hanger. The hangers and supporting steel shall not be attached to the roof deck construction.

3.05 ALL VERTICAL PIPING shall be installed plum and true. Horizontal piping specified to be graded shall be installed at a straight and uniform grade without pockets. Horizontal piping not specified to be graded, shall be installed in a straight and true manner.

3.06 ALL PIPING SYSTEMS shall be arranged to drain to one or more low points. Each low point shall be equipped with a hose and valve drain connection.

3.07 UNIONS and/or companion flanges shall be provided at all equipment connections and elsewhere as indicated on the drawings or as required for easy removal of equipment.

3.08 Deleted

3.09 WATER PIPING

A. Piping shall be graded upward in the direction of flow not less than 1" per 40 feet. The run-outs shall be graded in a manner to prevent the formation of air traps when the mains expand and contract. Reductions in pipe size shall be accomplished by an eccentric reducer with the flat side on top. Manual air vents shall be installed at the ends of mains, at all high points in the system, and elsewhere as indicated on the drawings. Run-outs and branch lines shall be connected to the underside of mains unless indicated otherwise.

3.10 DRAINS

A. Condensate and equipment drains shall be graded downward in the direction of flow not less than 1/4" per foot. Unless otherwise indicated, the drains shall spill into floor drains, hub drains, or on grade in a manner as approved by the Architect. Provide drain valves on piping system at low points and at interval required for proper system drainage.

3.11 RELIEF VALVE DISCHARGE LINES

A. Lines shall be installed to drain the entire relief line. Relief lines shall be supported in a manner to prevent any weight being placed on the relief valve. All relief lines shall have a plain section of pipe at the discharge point without threads.
3.12 FILLING, CLEANING, AND FLUSHING ALL WATER SYSTEMS

A. Prior to beginning chemical cleaning and final treatment, the Contractor shall notify the Engineer in writing 7 days in advance. A representative of the Engineering firm must be present for all cleaning and treatment. If Contractor performs work without notifying Engineer to allow a representative to be present and witness the cleaning, the procedure will not be accepted and will require re-cleaning in the presence of the Engineer.

B. All water systems shall be filled, flushed, and cleaned in strict accordance with equipment manufacturer's recommendations. Submit proposed chemical cleaning procedure to Engineer for approval prior to execution of this phase of work. Damage to equipment resulting from the use of improper cleaning and flushing methods shall be corrected at Contractor's expense. All systems shall be chemically cleaned prior to final fill and before any testing.

C. After final cleaning and flush, water samples shall be taken and analyzed by an independent laboratory. Based on the results of this analysis, the system shall be treated with a permanent corrosion inhibitor and neutralizing agent. After treatment more samples shall be taken and analyzed. This process shall be repeated as many times as necessary until an acceptable laboratory report is received. A copy of all reports shall be delivered to the Engineers for review prior to final acceptance of system.

D. As a minimum, the following steps shall be accomplished during cleaning of the closed loop system. These steps are considered the minimum required and may be modified based on recommendations of the chemical treatment company during the submittal phase of the project.

1. All flushing shall be a bleed and feed operation. No fill and drain cleaning will be acceptable.
2. All piping to coils shall be piped together to prevent loop water from circulating through the coils during cleaning until system is completely cleaned, flushed, and final chemical treatment is added.
3. The closed loop system shall be initially flushed with potable water for a period of not less than 24 hours, but as long as necessary to remove all loose debris from the system.
4. After initial flushing and before chemical cleaning, any filters and/or solids separator shall be cleaned.
5. The initial chemical cleaning shall be accomplished with a chemical capable of dissolving and holding in suspension mill scale, rust, oils, and other substances commonly found in piping systems. During this phase of the cleaning process the loop water temperature shall be raised and maintained at 140°F. Also during this phase of the cleaning process any filters and/or solids separator shall be checked and cleaned frequently. The frequency of filter and separator cleaning shall be field determined, based on the quantity of debris observed.
6. After circulating the initial chemicals for the period recommended by the chemical treatment company, the system shall be flushed with potable water to remove all chemical and debris.
7. If necessary a neutralizing agent shall be added to the system in accordance with the chemical treatment manufacturer's recommendations.
8. Steps 4, 5, & 6 shall be repeated as many times as necessary to insure complete system cleaning.
9. Immediately after all chemical cleaning is complete, the permanent water treatment shall be added. The permanent treatment shall be designed to prevent corrosion, inhibit rust, and prevent microbiological and bacterial growth in the closed loop system.

E. Where new piping is installed in an existing system the new piping shall be installed and configured to allow flushing and cleaning prior to incorporating into the new piping system. The contractor shall be responsible for providing temporary piping and pumping system to facilitate clean of new piping as outlined above.

3.13 PAINTING

A. Contractor shall paint all exposed piping, both insulated and non-insulated that is installed under his contract.

B. Paint and label all piping or insulation around piping according to standard colors as indicated in Chapter 37 (PIPING SYSTEM IDENTIFICATION) of 2013 ASHRAE.FUNDAMENTALS. Submit proposed colors and markings to A/E for approval.

3.14 INSULATION

A. Insulate all piping as specified in Section 23 07 00 of these specifications.

3.15 NAMEPLATES

A. Provide nameplates for equipment, gages, thermometers, and valves. Minimum size of nameplates shall be 1.0 inch by 2.5 inches. Lettering shall be minimum of 0.25 inch high normal block style. Each inscription shall identify the function. Equipment nameplates shall show the following information.

1. Manufacturer, type, and model number
2. Capacity or size
3. System in which installed
4. System which is controlled

END OF SECTION
SECTION 23 05 23

VALVES

PART 1 GENERAL

1.01 DESCRIPTION

A. The work under this section includes furnishing and installing all valves for the project. Provisions of this section apply to all mechanical specifications sections.

1.02 GENERAL REQUIREMENTS

A. Isolation valves shall be installed in the inlet and outlet connection to each chiller, chilled water coil, pump, and at all other equipment. All valves used for isolation service shall be ball valve or butter-fly valves unless specifically noted otherwise.

B. All valves shall be suitable for the service for which they are installed and shall be fitted with proper seats, discs, packing, lubricants, etc. All gate, globe and angle valves shall have back seats for repacking under pressure. All valves shall be installed with the stem horizontal or above. Each valve shall be individually pressure tested on shell and seat. All valves shall be designed for not less than 150 psig service minimum.

C. Valves shall be Jenkins as specified hereinafter. Suppliers of comparable products are Crane, Kennedy, Walworth, Lunkenheimer, Milwaukee, Powell, Stockham, Nibco, and Hammond unless otherwise indicated.

D. Valves for mechanical systems shall be of the same manufacturer except specialty items.

PART 2 PRODUCTS

2.01 VALVES FOR WATER SERVICE (HVAC Systems)

A. Gate Valves: (Utilized on Steam system only)

1. Valves 2" and smaller shall be screw pattern, bronze body, union bonnet, rising stem, solid wedge, 200 psi W.W.F., Jenkins Fig. 47-U.

2. Valves 2-1/2" and larger shall be flange pattern, iron body, O.S. & Y., composition disc, renewable bronze seat ring, 200 psi W.W.P., Jenkins Fig. 651-A.

3. Valves, solder end of copper tubing 3" and smaller, bronze body, screw in bonnet, rising stem, solid wedge, 200 psig W.W.P. Jenkins 1242.

4. Gate Valves in water lines outside the building or underground shall be as follows and shall be installed with valve boxes.

5. Valves 2 inches and smaller shall be Jenkins No. 1240 with operating nut.

6. Valves 2-1/2 inches and larger shall be Jenkins No. 325 with 2 inch square operating nut.
7. Valves 2 inches through 3 inches may, at the Contractor's option, be Jenkins No. 1240.

B. Globe Valves:
   1. Valves 2-1/2" and larger shall be flange pattern, iron body, O.S. & Y., composition disc, renewable bronze seat ring, 200 psi W.W.P., Jenkins Fig 142 globe.
   2. Valves, solder end for cooper tubing 3" and smaller, bronze body, screw in bonnet, renewable composition disc, 200 psi W.W.P., Jenkins Fig. 1200 or 1202.

C. Check Valves:
   1. Valves 2" and smaller, shall be screw pattern, bronze body, 45 degree regrinding swing check, renewable seat, 200 psi W.W.P., Jenkins Fig 92-A.
   2. Valves 2-1/2" and larger shall be flange pattern, iron body, bronze trim, regrind-renew disc and seat ring, 200 psi, W.W.P., Jenkins Fig. 624.
   3. Valves, solder end for copper tubing 3" and smaller, bronze body, 45 degree regrinding bronze swing disc, 200 psi, W.W.P., Jenkins Fig. 1222.

D. Hose End Valves:
   1. Valves shall be Jenkins Fig. 372 bronze gate valves with standard garden hose threads and with caps and chains or shall be gate valve with hose adaptor.

E. Butterfly Valves:
   1. At the Contractor's option butterfly valves may be used for isolation service in HVAC chilled water, hot water, or condenser water lines that are 2-1/2" and larger. Butterfly valves used for isolation at items of equipment shall have lug type body, drilled and tapped, so equipment connection can be removed without removal of valve or draining of lines. Single valves used for both balancing and isolation generally will not be allowed. Butterfly valves shall not be installed so close to other equipment that the wide open disc will touch any part of the equipment.
   2. Valves shall have cast iron bodies with bronze or ductile iron disc, stainless steel shaft and lock bolts, and shaft extension to clear 2-1/2" insulation minimum. The valve shall have a reinforced resilient line, non-collapsible and blow-out proof, or Buna or other suitable material, for the temperatures to be encountered and shall give bubble tight shutoff at not less than 175 psig working pressure. The valve shall be suitable for non-shock hydrostatic pressure test of 200 psig. The valves shall have 150 lbs. flanges or shall be for mounting between 150 lbs. flanges. Valves 2-1/2 through 6" small have manual lever operators. Valves 8" and larger shall have enclosed gear operators. Valves shall be Jenkins 220 or 230 series. Suppliers of comparable products are Crane, Demco, Keystone, Mission, Muller, Norris, Powell and Centerline.
F. Silent Check Valves:

1. Silent check valves shall be installed at each water pump. The valves shall be center guided, spring loaded, non slam low pressure drop type.
2. 2" and smaller, bronze body, screwed new, bronze trim, stainless steel spring, 200 psi W.W.P., Muller Steam Specialty Co. 203 BP.
3. 2-1/2 through 10", semi steel body, wafer type, bronze trim, stainless steel spring, 125 psi W.W.P., Muller 101-AP.
4. 12" and larger, semi steel body, globe type, bronze trim, stainless steel spring, 125 psi W.W.P., Muller 105-AP.

2.02 STOP AND WASTE VALVES

A. Valves 2 inches and smaller shall be Grinnell No. E 2912 lever handle cocks, except valves in piping underground shall be E 2892 Tee handle.

2.03 BALANCING COCKS

A. Cocks 1" size and smaller shall be bronze body, screw ends, angle or straightway union pattern, Sarco "Balance Master" suitable for tight shutoff and 200 psig W.W.P. or equal ball valve with memory stop by Appollo or NIBCO.

B. Cocks 1-1/4" and larger shall be of the lubricated plug cock type, semi-steel., and suitable for a working pressure of 175 psig. the cocks shall be ACF Fig. R1430 screw pattern up through 2" size and shall be Fig. R-1431 flange pattern for sizes 2-1/2" and larger. Suppliers of comparable products are Nordstrom and Walworth.

2.04 BALANCING VALVES (Circuit Setters)

A. Balancing valves 3" and smaller shall be bronze body, screw ends, Teflon seats, stainless steel ball with precision machined orifice, and urethane packing. Valve shall be provide with a Schrader valve connection on each side of orifice for meter connection. Pressure rated 175 psi continuous duty and temperature rated 250 degrees F continuous duty.

B. Balancing valves 4" and larger shall be Semi Steel body, flange connection pattern, Teflon seats, stainless steel lubricated plug with precision machined orifice, and urethane packing. Valve shall be provide with a Schrader valve connection on each side of orifice for meter connection. Pressure rated 175 psi continuous duty and temperature rated 250 degrees F continuous duty.

C. Contractor shall provide one calibrated read out to Owner for future use with balancing valves.

D. Balancing valves shall be TACO Circuit Setter, GERAND Indicator ball valve, or approved equal.
2.05 BALL VALVES

A. Valves 2" and smaller shall be screw pattern, bronze body, 600 lb. WOG, Watts No. B-6000.

1. Valves above grade shall be provided with standard lever handle, Durafil seats, and hardened chrome plated ball. Valves on insulated lines shall be provide with valve handle extension of sufficient length to allow handle operation above outer layer of insulation.

2. Valves below grade shall be located in valve boxes and shall be provided with T-handle operator, stainless steel ball and stem, and mineral filled TFE seats and seals. Valves on insulated lines shall be provided with valve handle extension of sufficient length to allow handle operation above outer layer of insulation.

B. Valves 2-1/2" and larger shall be flanged pattern, Semi Steel body, 600 lb. WOG, Watts No. B-6000.

1. Valves above grade shall be provided with standard lever handle, Durafil seats, and hardened chrome plated ball. Valves on insulated lines shall be provide with valve handle extension of sufficient length to allow handle operation above outer layer of insulation.

2. Valves below grade shall be located in valve boxes and shall be provided with T-handle operator, stainless steel ball and stem, and mineral filled TFE seats and seals. Valves on insulated lines shall be provided with valve handle extension of sufficient length to allow handle operation above outer layer of insulation.

C. Suppliers of comparable products are Nibco, Smith, Apollo, Clayton, and Gemini.

PART 3 EXECUTION

3.01 ALL VALVES shall be installed as recommended by valve manufacturer.

3.02 ADEQUATE PRECAUTIONS shall be taken to protect sweat or weld valves during the sweating or welding process.

3.03 GATE VALVES shall not be used for isolation service on hot water or chilled water systems only full ported ball valves shall be used on these systems. All system isolation valves shall be either full ported ball valves or positive shutoff butterfly valves depending on pipe size.

END OF SECTION
SECTION 23 05 48

VIBRATION ISOLATION AND SEISMIC RESTRAINT

PART 1 GENERAL

1.01 DESCRIPTION

A. The work in this section consists of furnishing engineering and materials necessary for vibration isolation and seismic restraints for equipment contained herein for the project.

B. All mechanical equipment 3/4 HP and over listed in the Vibration Isolation / Seismic schedule shall be mounted on vibration isolators to prevent the transmission of objectionable vibration and vibration induced sound to the building structure.

1. All isolation materials, flexible connectors and seismic restraints shall be of the same manufacturer and shall be selected and certified using published or factory certified data. Any variance or non-compliance with these specification requirements shall be corrected by the contractor in an approved manner at no cost to the Owner.

2. The contractor and manufacturer of the isolation and seismic equipment shall refer to the isolator and seismic restraint schedule that lists isolator types, isolator deflections and seismic restraint type. Vibration isolators shall be selected in accordance with the equipment, pipe or duct weight distribution so as to produce reasonably uniform deflections.

C. Install full line size flexible pipe connectors at the inlet and outlet of each pump, cooling tower, condenser, chiller, coiling connections and where shown on the drawings. All connectors shall be suitable for use at the temperature, pressure, and service encountered at the point of installation and operation. End fitting connectors shall conform to the pipe fitting schedule. Control rods or protective braid must be used to limit elongation to 3/8”. Flexible connectors shall not be required for suspended in-line pumps.

D. Unless otherwise specified, all mechanical, and plumbing equipment, pipe, and duct shall be restrained to resist seismic forces. Restraints shall maintain equipment, piping, and duct work in a captive position. Restraint devices shall be designed and selected to meet the seismic requirements as defined in the latest issue of the IBC or local jurisdiction building code.

1.02 SEISMIC RESTRAINT SHALL NOT BE REQUIRED FOR THE FOLLOWING:

A. Hanging, wall mounted, and flexibly supported mechanical, plumbing and components that weigh 20 pounds (89 N) or less, where \( I_p = 1.0 \) and flexible connections are provided between the components and associated duct work, piping and conduit.
B. Piping supported by individual clevis hangers where the distance, as measured from the top of the pipe to the supporting structure, is less than 12 inches (305mm) for the entire pipe run and the pipe can accommodate the expected deflections. Trapeze or double rod hangers where the distance from the top of the trapeze or support to the structure is less than 12 inches for the entire run. Hanger rods shall not be constructed in a manner that would subject the rod to bending moments (swivel, eye bolt, or vibration isolation hanger connection to structure).

C. High deformability piping (steel, copper, aluminum with welded, brazed, grooved, or screwed connections) designated as having an Ip = 1.5 and a nominal pipe size of 1 inch (25 mm) or less where provisions are made to protect the piping from impact or to avoid the impact of larger piping or other mechanical equipment. Note, any combination of piping supported on a trapeze where the total weight exceeds 10 lb/ft must be braced.

D. High deformability piping (steel, copper, aluminum with welded, brazed, grooved, or screwed connections) and limited deformability piping (cast iron, FRP, PVC) designated with an Ip = 1.0 and a nominal pipe size of 1 inch and less in the mechanical equipment room, or 2” and less outside the mechanical equipment room.

E. PVC or other plastic or fiberglass vent piping.

F. HVAC ducts suspended from hangers that are 12 inches (305 mm) or less in length from the top of the duct to the supporting structure and the hangers are detailed to avoid significant bending of the hangers and their connections. Duct must be positively attached to hanger with minimum #10 screws within 2” from the top of the duct.

G. HVAC duct with an Ip = 1.5 that have a cross-section area less than 4 square feet. HVAC ducts with an Ip = 1.0 that have a cross-sectional area of less than 6 square feet (0.557 m2).

H. Equipment items installed in-line with the duct system (e.g., fans, heat exchangers and humidifiers) with an operating weight less than 76 pounds (334 N). Equipment must be rigidly attached to duct at inlet and outlet.

1.03 MANUFACTURER’S RESPONSIBILITIES: Manufacturer of vibration and seismic control products shall have the following responsibilities:

A. Determine vibration isolation and seismic restraint sizes and locations.

B. Provide piping, ductwork and equipment isolation systems and seismic restraints as scheduled or specified.

C. Provide installation instructions and shop drawings for all materials supplied under this section of the specifications.
D. Provide calculations to determine restraint loads resulting from seismic forces presented in local building code or IBC, Chapter 16 latest edition. Seismic calculations shall be certified & stamped by an engineer in the employ of the seismic equipment manufacturer with a minimum 5 years experience and licensed in the project’s jurisdiction. Provide calculations for all floor or roof-mounted equipment, all suspended or wall mounted equipment 20lbs (89 N) or greater, and vibration isolated equipment 20lbs (89 N) or greater.

E. Seismic restraint load ratings must be certified and substantiated by testing or calculations under direct control of a registered professional engineer.

F. Calculations and restraint device submittal drawings shall specify anchor bolt type, embedment, concrete compressive strength, minimum spacing between anchors, and minimum distances of anchors from concrete edges. Concrete anchor locations shall not be near edges, stress joints, or an existing fracture. All bolts shall be ASTM A307 or better.

1.04 QUALITY CONTROL

A. The isolators and seismic restraint systems listed herein are as manufactured by Amber / Booth, Mason Industries, Kinetics, or approved equals which meet all the requirements of the specifications, are acceptable. Manufacturer must be a member of the Vibration Isolation and Seismic Control Manufacturers Association (VISCMA).

B. Steel components shall be cleaned and painted with industrial enamel. All nuts, bolts and washers shall be zinc-electroplated. Structural steel bases shall be thoroughly cleaned of welding slag and primed with zinc-chromate or metal etching primer.

C. All isolators, bases and seismic restraints exposed to the weather shall utilize cadmium-plated, epoxy coat or PVC coated springs and hot dipped galvanized steel components. Nuts, bolts and washers may be zinc-electroplated. Isolators for outdoor mounted equipment shall provide adequate restraint for the greater of either wind loads required by local codes or withstand a minimum of 30 lb. / sq. ft. applied to any exposed surface of the equipment.

1.05 SUBMITTALS

A. Submit shop drawings of all isolators, seismic restraints and calculations provided.

B. The manufacturer of vibration isolation products shall submit the following data for each piece of isolated equipment: clearly identified equipment tag, quantity and size of vibration isolators and seismic restraints for each piece of rotating isolated equipment. Submittals for mountings and hangers incorporating springs shall include spring diameter and free height, rated deflections, and solid load. Submittals for bases shall clearly identify locations for all mountings as well as all locations for attachment points of the equipment to the mounting base. Submittals shall include seismic calculations signed and checked by a qualified licensed engineer in the employ of the manufacturer of the vibration isolators. Catalog cut sheets and installation instructions shall be included for each type of isolation mounting or seismic restraint used on equipment being isolated.
C. Provide shop drawings indicating location of all specification SC cable restraints (section 2.3.2) required for pipe and ductwork. Drawings must be stamped by manufacturer’s registered professional engineer.

D. Mechanical, electrical and plumbing equipment manufacturers shall provide certification that their equipment is capable of resisting expected seismic loads without failure. Equipment manufacturers shall provide suitable attachment points and/or instructions for attaching seismic restraints.

PART 2 PRODUCTS

2.01 VIBRATION ISOLATORS

A. Specification W: a pad type mounting consisting of two layers of ribbed elastomeric pads with a ½” poro-elastic vibration absorptive material bonded between them. Pads shall be sized for approximate deflection of 0.10” to 0.18”. Pads shall be Amber / Booth Type NRC or equal.

B. Specification A: an elastomeric mounting having a steel baseplate with mounting holes and a threaded insert at the top of the mounting for attaching equipment. All metal parts shall be completely embedded in the elastomeric material. Mountings shall be designed for approximately 1/2” deflection, and incorporate a steel seismic snubber with all directional restraint. Mountings shall be Amber/Booth Type SRVD or equal.

C. Specification B: an adjustable, freestanding, open spring mounting with combination leveling and equipment fastening bolt. The spring shall be welded to the spring mounting baseplate and compression plate for stability. The isolator shall be designed for a minimum kx/ky (horizontal-to-vertical spring rate) of 1.0. An elastomeric pad having a minimum thickness of 1/4” shall be bonded to the baseplate. Nuts, adjusting bolts and washers shall be zinc-electroplated to prevent corrosion. This type isolator must be used with specification SL seismic restraint (section 2.3.1). Isolators shall be Amber/Booth Type SW or equal.

D. Specification C: a unitized adjustable, stable open spring isolator with a seismic restraint housing which serves as a blocking device during equipment installation. The spring package shall include an elastomeric pad for high frequency absorption at the base of the spring. The springs shall be designed for a minimum kx/ky (horizontal-to-vertical spring rate) of 1.0. Nuts, adjusting bolts and washers shall be zinc-electroplated to prevent corrosion. The spring assembly shall be removable with equipment in place and shall fit within a welded steel enclosure consisting of a top plate and rigid lower housing. Isolated seismic restraint bolts shall connect top plate to lower housing to resist seismic and wind forces in all directions and limit motion to a maximum of 1/4” movement before engaging. Surfaces that engage under seismic motion shall be cushioned with a resilient elastomeric pad or grommet to protect equipment. Top plate shall have adequate means for fastening to the equipment, and baseplate shall have adequate means for bolting to structure. Entire assembly shall be rated to exceed the applied seismic load (para 1.3). Seismic isolator shall be Amber/Booth Type CTER or equal.
E. Specification D: an elastomeric hanger consisting of a rectangular steel box capable of 200% minimum overload without visible deformation, 30 degree rod misalignment and an elastomeric isolation element designed for approximately 1/2” deflection. Hangers shall be Amber/Booth Type BRD or equal.

F. Specification E: a combination spring and elastomeric hanger consisting of a rectangular steel box capable of 200% minimum overload without visible deformation, 30 degree rod misalignment, coil spring, spring retainers and elastomeric element designed for approximately 1/2” deflection. The spring shall be designed for a minimum kx/ky (horizontal-to-vertical spring rate) of 1.0. Spring hangers shall be Amber/Booth Type BSRA or equal.

G. Specification F: a set (two or more) of spring thrust resisting assemblies, which consist of coil springs, spring retainer, isolation washer, angle mounting brackets, and elastomeric tubing for isolating thrust resister rod from fan discharge. Thrust restraints shall be Amber / Booth Type TRK or equal.

H. Specification SB: a unitized adjustable open spring isolator and a welded steel housing designed to resist seismic forces in all directions. Restraint surfaces which engage under seismic motion shall be cushioned with a resilient elastomer to protect equipment. Restraints shall allow a maximum of 1/4” movement before engaging and shall allow for the spring to be changed if required. Isolator shall be a stable spring with a minimum kx/ky of 1.0. The spring package shall include an elastomeric pad for high frequency absorption at the base of the spring. Nuts and bolts shall be zinc-electroplated to prevent corrosion. Bolting equipment to isolator with bolts smaller than main adjusting bolt will not be allowed. Baseplate shall provide means for bolting to the structure. Entire assembly shall be rated to exceed the applied seismic load (para 1.3.). Mountings shall be Amber/Booth Type SWSR or equal.

2.02 BASES

A. Specification G: a welded integral structural steel fan and motor base with NEMA standard motor slide rails and holes drilled to receive the fan and motor slide rails. The steel members shall be adequately sized to prevent distortion and misalignment of the drive, and specifically, shall be sized to limit deflection of the beam on the drive side to 0.05” due to starting torque. Snubbers to prevent excessive motion on starting or stopping shall be furnished if required; however, the snubbers shall not be engaged under steady running conditions. Bases shall be Amber/Booth Type SFB or equal.
B. Specification H: a welded WF (main member) structural steel base for increasing rigidity of equipment mounted thereon or for unitizing belt driven fans. Fan bases shall have holes drilled to match fan and located to provide required center distance between fan and supplied NEMA standard motor slide rails. The steel members shall have minimum depth of 1/12 of the longest span, but not less than 6” deep. Junior beams and junior channels shall not be used. Cross members shall be provided where necessary to support the equipment or to prevent twisting of the main members. Where height restrictions prevent the use of members having a depth of 1/12 of the longest span, beams of less depth may be used provided they have equal rigidity. Provide height-saving brackets for side mounting of the isolators. Brackets for use with Specification type B isolators having 2.5” deflection or greater shall be of the precompression type to limit exposed bolt length. Bases shall be Amber/Booth Type WSB or equal.

C. Specification J: a concrete inertia base consisting of perimeter structural steel concrete pouring form (CPF), reinforcing bars welded in place, bolting templates with anchor bolts and height-saving brackets for side mounting of the isolators. Brackets for use with Specification type B isolators having 2.5” deflection or greater shall be of the precompression type to limit exposed bolt length. The perimeter steel members shall have a minimum depth of 1/12 of the longest span, but not less than 6” deep. The base shall be sized with a minimum overlap of 4” around the base of the equipment and, in the case of belt-driven equipment, 4” beyond the end of the drive shaft. Fan bases are to be supplied with NEMA standard motor slide rails. The bases for pumps shall be sized to support the suction elbow of end suction pumps and both the suction and discharge elbows of horizontal split-case pumps. The bases shall be T-shaped where necessary to conserve space. Inertia bases shall be Amber/Booth Type CPF or equal.

2.03 SEISMIC RESTRAINTS

A. Specification SL: a restraint assembly for floor mounted equipment consisting of welded steel interlocking assemblies welded or bolted securely to the equipment or the equipment bases and to the supporting structure. Restraint assembly surfaces which engage under seismic motion shall be lined with a minimum ¼” thick resilient elastomeric pad to protect equipment. Restraints shall be field adjustable and be positioned for 1/4” clearance as required to prevent interference during normal operation. Restraint assembly shall have minimum rating of 2 times the catalog rating at 1 G as certified by independent laboratory test. Restraint shall be Amber/Booth Type ER or equal.

B. Specification SC: a restraint assembly for suspended equipment, piping or ductwork consisting of high strength galvanized steel aircraft cable. Cable must have Underwriters Laboratories listed certified break strength, and shall be color-coded for easy field verification. Secure cable to structure and to braced component through bracket or stake eye specifically designed to exceed cable restraint rated capacity. Cable must be manufactured to meet or exceed minimum materials and standard requirements per AISI Manual for structural applications of steel cables and ASTM A630. Break strengths must be per ASTM E-8 procedures. Safety factor of 1.5 may be used when prestretched cable is used with end connections designed to meet the cable break strength. Otherwise safety factor 3.76 must be used. Cables shall be sized for a force as listed in section 1.3. Cables
shall be installed to prevent excessive seismic motion and so arranged that they do not engage during normal operation. Restraint shall be Amber/Booth Type LRC or equal.

2.04 FLEXIBLE PIPE CONNECTIONS

A. Specification K: Water Service: For flanged connection – a double sphere arch rubber expansion joint constructed of molded reinforced neoprene with integral steel floating flanges, and designed to be suitable for pressures up to 225 PSI (4 to 1 safety factor) and temperatures up to 225 degrees F. Connectors shall have minimum movement capabilities of 1.77” compression, 1.18” lateral and 1.18” extension. Connectors shall provide a minimum 35 degree angular movement up to 6”, minimum 30 degree up to 12” and minimum 20 degree up to 24”. Spring loaded control units shall be furnished to limit movement to within allowables. Flex connector shall be Amber/Booth Type 2600 or equal.

1. Water Service: For threaded type – A double spherical rubber hose connector, minimum 8” long, constructed of molded neoprene, nylon cord reinforced, with female pipe unions each end. Connectors shall have a minimum movement capability of 7/8” compression, 7/8” lateral, ¼” extension and 20 degree angular through 1-1/4”, 13 degree through 2”, and 9 degree through 3”. Connectors shall be suitable for a maximum working pressure (4 to 1 safety factor) of 150 psi and 225 degree F. Connectors shall have cable control units to limit extension to ¼”. Flex connector shall be Amber/Booth Type 2655 or equal.

B. Specification L: Steam and Condensate Service:

1. For flanged connection – a metal hose connector constructed of stainless steel hose and braid with carbon steel plate flanges. Live lengths shall conform to hose minimum length to absorb thermal and dynamic movement. Hose axis must be perpendicular to pipe movement. Flex connector shall be Amber/Booth Type SS-FP or SS-FW or equal.

2. For threaded connections - a metal hose connector constructed of stainless steel hose and braid with carbon steel NPT threaded end fittings. Flex connector shall be Amber/Booth Type SS-PM or equal.

PART 3 EXECUTION

3.01 Isolator and seismic restraints shall be installed as recommended by the manufacturer. Isolate all mechanical equipment 3/4 hp and over per the isolation schedule and these specifications.

3.02 PIPING ISOLATION

A. Horizontal Pipe Isolation: all HVAC pumped water, steam, pumped condensate, glycol, and refrigerant piping size 1 1/4” and larger connected to isolated equipment shall be isolated for the first 3 support locations from externally isolated equipment with specification E hangers or specification SB or SX floor mounts with the same deflection as equipment isolators (max 2”).
Vibration Isolation and Seismic Restraint

B. Pipe Riser Isolation: All variable temperature vertical pipe risers 1-1/4” and larger, riser piping requiring isolation per para. 3.2.1 or where specifically shown and detailed on riser drawings shall be fully supported by specification B mounts with precompression plates. Steel spring deflection shall be .75 inch minimum except in those locations where added deflection is required due to pipe expansion and contraction. Spring deflection shall be a minimum of 4 times the anticipated deflection change. Springs shall be selected to keep the riser in tension. Pipe risers up through 16” shall be supported at intervals of every third floor of the building. Pipe risers 18” and over, every second floor. Wall sleeves for take-offs from riser shall be sized for insulation O.D. plus two times the anticipated movement to prevent binding. Horizontal take-offs and at upper and lower elbows shall be supported with spring isolators as required to accommodate anticipated movement. In addition to submittal data requirements previously outlined, riser diagrams and calculations shall be submitted for approval. Calculations must show anticipated expansion and contraction at each support point, initial and final loads on the building structure, and spring deflection changes. Submittal data shall include certification that the riser system has been examined for excessive stresses and that none will exist if installed per design proposed. Riser supports shall be Amber/Booth Type SWP or equal.

3.03 DUCT ISOLATION

A. Isolate all duct work with a static pressure 2” W.C. and over in equipment rooms and to minimum of 50 feet from the fan or air handler. Use specification type E hangers or type SB (SX) floor mounts.

3.04 INSTALLATION

A. Comply with manufacturer’s instructions for the installation and load application of vibration isolation materials and products. Adjust to ensure that units do not exceed rated operating deflections or bottom out under loading, and are not short-circuited by other contacts or bearing points. Remove space blocks and similar devices (if any) intended for temporary support during installation or shipping.

B. Locate isolation hangers as near the overhead support structure as possible.

C. Adjust leveling devices as required to distribute loading uniformly on isolators. Shim units as required where leveling devices cannot be used to distribute loading properly.

D. Install isolated inertia base frames and steel bases on isolator units as indicated so that a minimum of 1inch clearance below base will result when supported equipment has been installed and loaded for operation.

E. Seismic Rated roof curbs shall be installed directly to building structural steel or concrete roof deck. Installation on top of steel deck or roofing material is not acceptable. Shimming of seismic rated curbs is not allowed.
F. Housekeeping Pads shall be constructed and installed per ASHRAE’s “A Practical Guide to Seismic Restraint”. They shall be a minimum of .5” thicker than the maximum embedment required of any anchor but not less than 6”. They shall be sized to provide minimum edge distances for all installed anchors. They must be anchored to the floor structure in an approved manner.

3.05 APPLICATION OF SEISMIC RESTRAINTS

A. ISOLATED EQUIPMENT

1. All floor mounted isolated equipment shall be protected with type SB or type C unitized isolator and restraint or with separate type SL restraints (minimum of 4) in conjunction with type B isolators. For equipment with high center of gravity additional cable restraints shall be furnished, as required by isolation manufacturer, to limit forces and motion caused by rocking.

2. All suspended isolated equipment and vessels shall be protected with specification SC restraints. Cables shall be installed to prevent excessive seismic motion and so arranged that they do not engage during normal operation.

B. Rigidly Mounted Equipment

1. Floor mounted equipment shall be protected by properly sized anchor bolts with elastomeric grommets provided by the isolation manufacturer. Suspended equipment shall be protected with type SC bracing.

3.06 PIPING

A. All piping shall be protected in all planes by type SC restraints, designed to accommodate thermal movement as well as restrain seismic motion. (Spring-loaded control rods should be used on flexible connectors in system). Tanks and vessels connected inline to piping shall be restrained independently. Locations shall be as determined by the isolator/seismic restraint supplier and shall include, but not be limited to: (1) At a proximity to protect all drops to equipment connections. (2) At changes in direction of pipe as required to limit over stressing of pipe or movement that contacts other building material. (3) At horizontal runs of pipe, not to exceed the spacing as presented in Amber/Booth design criteria. (4) SMACNA design criteria. Seismic restraints shall not be required for piping exempted by paragraph 1.2.

B. Where riser pipes pass through cored holes, core diameters to be a maximum of 2” larger than pipe O.D. including insulation. Cored holes must be packed with resilient material or firestop as provided by other sections of this specification or local codes. No additional horizontal seismic bracing is required. Restrained isolators type C or SB shall support risers and provide longitudinal restraint at floors where thermal expansion is minimal and will not bind isolator restraints. For risers in pipe shafts, specification type SC cable restraints shall be installed at each level in a manner that does not interfere with thermal movement.
3.07 DUCTWORK

A. Duct work 6 square feet and larger in cross sectional area shall be protected in all planes by type SC restraints. Locations shall be determined by the isolator supplier and shall include, but not be limited to: (1) at equipment connections as required to protect the connections. (2) at all duct runs and duct run ends (transverse bracing and longitudinal bracing not to exceed spacing specified in Amber/Booth design criteria, or SMACNA guidelines).
**EQUIPMENT ISOLATION AND SEISMIC SCHEDULE**

**PROJECT SEISMIC FACTORS**

Fa = UNKNOWN

- If Fa is unknown use the greater value of either Site Class D or E
- Zip Code 29425

* If Fa is unknown use the greater value of either Site Class D or E

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<th>EQUIPMENT TAG</th>
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<th>SEISMIC REST. SPEC.</th>
<th>ISOLATION DEFL.</th>
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**NOTES**

1. Anchor bolts for non-isolated and internally isolated equipment shall be sized by the seismic restraint supplier. If required, Spec. SL snubbers or Spec. SC cable kits shall be provided.
2. Roof curbs provided by others must be certified by a professional engineer for the required seismic loads
3. All Life Safety equipment, and all equipment in Seismic Use Group III buildings shall have Ip = 1.5
## CROSS REFERENCE

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<tr>
<th>SPEC TYPE</th>
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<td>PIPE ANCHOR</td>
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END OF SECTION
SECTION 23 05 93

BALANCING, ADJUSTING, AND TESTS

PART 1 GENERAL

1.01 SCOPE

A. Work in this section includes the adjusting and balancing of all heating, air conditioning, and ventilating and hydronic systems. The results of all tests, adjustments, and balancing shall be submitted to the Architect for approval.

B. Provide all labor, supervision, tools, equipment, instruments, additional materials, report forms, etc. as required to complete an accurate balance of the system.

C. Belts, drives, impellers, and motors shall be adjusted and/or changed as required to obtain the required air and water quantities against the developed system pressure.

D. The building air distribution is to be balanced to provide the quantity of air as shown on drawings. System air balance is to be accompanied with certified test forms (attached) as to obtained air quantities. Proper fan performance and coil discharge air temperature reading shall also be certified on test forms (attached).

E. The building water distribution system is to be balanced to provide the flow rates shown on drawings. System water balance is to be accompanied with certified test forms as to obtained air quantities. Water temperature readings across equipment shall be provided where appropriate.

F. Mechanical Contractor shall furnish competent personnel and necessary testing instruments and equipment to check, test, operate, and adjust all mechanical equipment and systems as installed. Tests shall be as required to ensure that all equipment is operating in accordance with manufacturer's recommendations, and requirements of this specification. Tests shall be of sufficient duration to prove adequacy and satisfactory performances of all items of equipment.

G. Mechanical contractor shall supply upon request without additional charge, instrumentation and personnel to spot check system balance in presence of Engineers and Owner.

H. All tests, balancing, and adjusting shall be performed as many times as required to prove project requirements have been met.

I. Control Contractor shall adjust and set all thermostats, program clock, and other control items of equipment as required. Contractor shall submit to the Architect and Engineers record copies of Control Contractor's certification that all specified control items of equipment have been installed, calibrated, and are operating properly.
1.02 QUALITY CONTROL

A. All testing and balancing work shall be performed in complete accordance with AABC Standards for Field Measurements and Instrumentation, by an Engineer approved independent balance and test firm.

B. All work shall be under the direct supervision of a professional who is qualified for testing and balancing the hydronic and air performance of heating, air conditioning, and ventilation systems and has a minimum five years experience in the field.

C. Testing and balancing instruments shall have been calibrated within a period of six months prior to use in this work. Instruments used shall be of high quality and as recommended by AABC for the particular application.

1.03 SUBMITTALS

A. Before starting field work, submit for approval forms, data sheets, a list of instruments and procedures.

B. Prior to acceptance of the system by the Owner, submit for approval a written report in triplicate. The reports shall be complete showing all quantities, velocities, pressure drops, and sizes.

PART 2 PRODUCTS

2.01 A. Provide all materials, test equipment and instruments required for the tests.

2.02 A. Belts, drives, impellers and motors shall be as specified in other sections of this specification for the equipment being adjusted.

PART 3 EXECUTION

3.01 ADJUSTMENTS

A. Thoroughly clean, flush, fill and test all systems as specifically recommended by the various equipment manufacturers and as required. Check all safety relief valves, high limit controls, freeze protection controls, and all other safety devices to determine if they are functioning properly.

B. Mechanical systems are intended to operate without objectionable noise and vibration. Make all reasonable adjustments to the installed materials and equipment to remove abnormal noise and vibration. Report, in writing, any condition that such adjustments do not correct.

C. Three sets of filters shall be provided. One set shall be installed for operation during construction and testing. The second set of filters shall be installed at time of final inspection and the third set of air filters shall be delivered to Owner prior to final acceptance of the project.
3.02 TESTING AND BALANCING

A. Balance and test Contractor shall provide personnel and instrumentation to adjust, balance, record, and submit not less than two test results (including final test) for each of the following:

1. Air Handling Units
   a. Total CFM
   b. Total Static Pressure
   c. Fan Suction Pressure
   d. Fan Discharge Pressure
   e. Motor Amperage and Voltage
   f. Fan RPM

2. DX Cooling Equipment
   a. Saturated suction temperature of refrigerant
   b. Superheat and Subcooling temperatures
   c. Coil entering air, db and wb temperatures (heating & cooling mode)
   d. Coil leaving air, db and wb temperatures
   e. Coil face area, Ft.
   f. Coil velocity, fpm
   g. Compressor Amperage
   h. Superheat

3. Adjust and record air quantities for all air distribution equipment in accordance with CFM's specified on drawings.

4. Check and record return and discharge air temperature from all refrigeration equipment.

B. Submit record copies of all testing and balancing reports to the Architect and Engineers.

C. Test results shall be presented on approved forms. Submit three (3) copies of these reports to the Owner for approval prior to final building acceptance.

END OF SECTION
SECTION 23 07 00

INSULATION OF MECHANICAL SYSTEMS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Trained personnel regularly engaged in the installation of insulation and approved by the insulation manufacturer shall install the insulation in a neat and professional manner.

B. Except where specifically specified otherwise, all insulation, adhesives, coverings and coatings shall be applied in strict accordance with its respective manufacturer's recommendations.

C. No wheat paste or organic materials that breed or sustain mold shall be used in conjunction with the insulation work.

D. The Contractor shall verify that all tests and inspections of the work to be insulated have been completed and approved before the insulation is applied.

E. Adequate provisions shall be made to protect the premises, equipment, and the work of other trades against all droppings, adhesives and coatings used in the installation.

F. Pipe unions, strainers and flanges on hot lines shall not be insulated; starting and stopping points for the insulation on hot lines shall be 1 inch on either side and shall be neatly tapered and tightly sealed. Cold lines subject to sweating shall be insulated throughout, including unions, flanges and strainers.

G. Ample provisions shall be made at hanger and support points to prevent the compression of insulation beyond that recommended by the insulation manufacturer for the application.

H. All insulation shall have a composite insulation, jacket, binders, and adhesives fire and smoke hazard rating as tested by procedure ASTM E84, NFPA 255, and UL 723, not exceeding the following values and shall be so listed by UL:

<table>
<thead>
<tr>
<th>Flame Spread</th>
<th>Smoke Developed</th>
</tr>
</thead>
<tbody>
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<td>25</td>
<td>50</td>
</tr>
</tbody>
</table>

I. All accessories, including but not limited to, adhesives, mastics, tapes, shall have the same component ratings. All materials shall be labeled indicating compliance with the above requirements. All treatments used to obtain the required ratings shall be permanent; water-soluble treatments will not be acceptable. Flexible elastomeric insulation with smoke developed exceeding 50 is prohibited in ceiling plenums, return air plenums, or ductwork.

1.02 SUBMITTALS

A. Submit shop drawings and data to prove complete compliance with these specifications on all products and methods of installation.
1.03 SCOPE

A. Includes but not limited to insulation of the following items:

1. All supply, return, exhaust and outside air ductwork.
2. All exposed supply, return, exhaust and outside air ductwork.
3. Condensate drain lines
4. All steam and condensate piping.
5. All hot water piping.
6. All chilled water and return chilled water piping along with associated valves and fittings.
7. Cold Equipment
8. Hot Equipment

PART 2 PRODUCTS

2.01 APPROVED PRODUCTS

A. The mastics, adhesives, and any other product used with the insulation shall be compatible with, and approved by, the insulation manufacturer.

B. The insulation shall be as specified in each section. Suppliers of comparable products: Arabol, Armstrong, Benjamin-Foster, Forty-Eight Insulations, Insul-Coustics, Koppers.Owens-Corning, Vimasco, and Webers

2.02 Deleted

2.03 AIR CONDITIONING CONDENSATE DRAIN LINES

A. Insulate condensate lines with 3/4" foamed rubber pipe insulation. Foam rubber insulation shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less as tested by ASTM E 84-75. Seal all seams and joints with adhesive equal to Armstrong 520.

B. Insulation shall be Armaflex "AP", or equal product by Rubatex, or Manville

2.04 REFRIGERANT LINE INSULATION

A. Flexible foamed pipe insulation. Foam rubber insulation shall have a maximum k factor of .27 and shall have an operating temperature range of -40 degrees F to 220 degrees F. Insulation shall comply with ASTM C-534 and UL 94-5v. Insulation shall be rated for use in return air plenum and shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less. Insulation as installed shall meet the minimum requirements of the current edition of the International Energy Conservation Code.

B. Thickness:

1. 1" thick for 1-1/2” outside diameter and smaller pipe.
2. 1-1/2" thick for pipes larger than 1-1/2” outside diameter pipe.
C. Approved Manufacturers: Armaflex, Rubatex, GSG "Ultrafoam", Halstead "Insul-tube", Manville Aerotube II, Imcolock, or Imcoaflex. Approved adhesives are Armaflex 520, Manville Micro-Lok 650, BFG Construction adhesive #105, Imcoa fuse seal joining system, or Imcoa Leaktite.

2.05 Deleted

2.06 COLD PIPING: (Water Above Floor)

A. This specification applies to all cold piping including, but not limited to the following:
   1. Chilled Water Piping
   2. Drain Piping subject to receiving cold drainage water, including drain body to a point where other drains tie in.

B. Insulation R values shall in all cases meet or exceed the requirements of ASHRAE 90.1. The thickness of insulation shall be not less than the following:

   Design Chill Water Temperature Between 40 and 55°F
   
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<th>Pipe Size</th>
<th>Maximum K value (BTU-in.)/(h-ft3-°F)</th>
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<td>2&quot;</td>
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C. The piping shall be insulated with preformed, sectional cellular glass pipe covering with factory applied vapor barrier jacket with self-sealing lap except at hanger points. The insulation shall have a maximum k value of .24 (BTU-in.)/(h-ft3-°F) at 75°F mean temperature.) The jacket shall have a water vapor permeance of .02 perms (ASTM E96) and shall have resistance to puncture of not less than 50 units per ASTM D781.

D. Chilled water exposed above grade shall be insulated with fiberglass sectional pipe covering, covered with two layers of pre-sized glass cloth and waterproof mastic and finished with a 0.016" thick corrugated aluminum jacket and sealed to prevent entry of water into the insulation. Insulation shall be applied over the electric heating tape. Mastics and all other products associated with the insulation shall be compatible with the electric heating cable.

E. Insulation shall be equal to Owens-Corning ASJ/SSL-II.

PART 3 EXECUTION

3.01 GENERAL

A. Install all insulation in strict accordance with the manufacturer's recommendations, using approved type laggings, adhesives, mastics, and other materials as applicable
3.02 Deleted

3.03 REFRIGERANT PIPING

A. Insulation shall fit in snug contact with pipe and be installed in accordance with manufacturer's recommendations.

B. Stagger joints on layered insulation.

C. Slip insulation on tubing before tubing sections and fittings are assembled keeping slitting of insulation to a minimum.

D. Seal joints in insulation with Manufacturer's approved adhesive.

E. Provide six inch long, 20 gauge galvanized steel sleeve around pipe insulation at each support.

F. Extend insulation through pipe support clamps.

G. Insulation exposed outside building shall have any required slit joints and seams placed on bottom of pipe and given two coats of gray adhesive finish.

H. Insulate fittings with sheet insulation and as recommended by Manufacturer.

I. Paint exterior exposed insulation with two coats of gray finish recommended by Insulation Manufacturer, then finish with a .016" thick aluminum jacket secured with stainless steel bands.

J. Underground refrigerant lines shall be run in rigid PVC conduit. Each line shall be run in a separate conduit of sufficient size to accommodate pipe and insulation. Where conduit penetrates exterior wall and interior floor slab, it shall be sealed with a waterproof mastic.

3.04 CONDENSATE DRAIN LINES

A. Seal all seams and joints with adhesive.

B. Where possible, slip insulation on piping without splitting.

3.05 ALL COLD AND HOT WATER PIPING:

A. All exterior piping shall be traced with electrical heat tracing for freeze protection prior to insulation.
B. At each hanger point on cold lines or combination cold and hot lines, a full length section of cellular glass insulation with factory applied fire retardant vapor-proof jacket shall be provided to completely encompass the pipe and form a traverse vapor seal and to provide a firm point for the hanger. All surfaces of the piping and inside surfaces of the insulation and all joints in the insulation shall be coated thoroughly with I-C 405 mastic in a jacket shall be sealed with I-C 215 lap cement. End joints shall be sealed to the fiberglass insulation with factory furnished 3" wide vapor barrier self-sealing lap tape. Aluminum bands shall be provided over the edges of the joint sealer strips on not greater than 12" on center.

C. Hangers for hot water lines shall be installed around the pipe and the insulation installed around the hanger. The insulation shall be applied to the pipe with all sides and end joints firmly butted. The longitudinal joints shall be sealed with the self-sealing lap and traverse joints shall be taped with 3 inch wide pressure sensitive pre-sized glass tape.

D. Insulation shall be applied to the pipe with all sides and end joints butted firmly. Seal off ends of insulation with white vapor barrier mastic at each fitting and at 21' intervals on continuous runs. The longitudinal joints shall be sealed with the self-sealing lap strip. The traverse joints shall be sealed with factory furnished 3" wide vapor barrier type pre-size glass cloth tape, pressure sensitive.

E. Insulated pipe risers inside the building that are exposed shall be protected from the floor to 8'-0' above the floor with a .016 inch thick corrupted aluminum jacket secured with stainless steel bands. Risers in shafts and chases do not require protection.

F. Contractor may, at his opinion, use 3" wide pressure sensitive vapor barrier pre-sized glass cloth to close the longitudinal joints in lieu of the self-sealing lap.

G. Insulation shall be applied to the pipe with all sides and end joints firmly butted. The longitudinal joints shall be sealed with the self-sealing lap and the traverse joints shall be taped with factory furnished 3" wide pressure sensitive pre-sized glass cloth tape.

H. Place sections of insulation around the pipe and joints tightly butted into place. The jacket laps shall be drawn tight and smooth. Secure jacket with fire resistant adhesive or factory applied self sealing lap.

I. Cover circumferential joints with butt strips, not less than 3-inches wide, of material identical to the jacket material. Overlap longitudinal laps of jacket material not less than 1 1/2 inches. Adhesive used to secure the butt strip shall be the same as used to secure the jacket laps.

J. Use a vapor-barrier coating or manufacturer's weatherproof coating for outside service on the ends of sections of insulation that butt against flanges, unions, valves, and fittings, and joints. Apply this vapor barrier coating at all longitudinal and circumferential laps.

K. Patch damaged jacket material by wrapping a strip of jacket material around the pipe and cementing and coating as specified for butt strips. Extend the patch not less than 1-1/2 inches past the break in both directions.

L. At penetrations by pressure gauges and thermometers, fill the voids with the vapor barrier coating for outside service. Seal with a brush coat of the same coating.
M. Do not use staples to secure jacket laps on pipes carrying fluid medium at temperatures below 35 °F.

N. Where penetrating roofs, insulate piping to a point flush with the top of the flashing and seal with the vapor barrier coating. Butt tightly the exterior insulation to the top of the flashing and interior insulation. Extend the exterior metal jacket 2 inches down beyond the end of the insulation. Seal the flashing and counter flashing underneath with the vapor barrier coating.

O. Pipe insulation shall be continuous through pipe hangers. Where pipe is supported by the insulation, provide MSS SP-58, Type 40 galvanized steel shields or MSS SP-58, Type 39 protection saddles conforming to MSS SP-69. Where shields are used on pipes 2 inches and larger, provide insulation inserts at points of hangers and supports.

1. Insulation inserts shall be of calcium silicate, cellular glass (minimum 8 pcf), molded glass fiber (minimum 8 pcf), or other approved material of the same thickness as adjacent insulation.

2. Inserts shall have sufficient compressive strength to adequately support the pipe without compressing the inserts to a thickness less than the adjacent insulation.

3. Insulation inserts shall cover the bottom half of the pipe circumference 180 degrees and be not less in length than the protection shield. Vapor-barrier facing of the insert shall be of the same material as the facing on the adjacent insulation.

4. Seal inserts into the insulation with vapor barrier coating for exterior work or manufacturers recommended weatherproof coating, as applicable.

5. Where protection saddles are used, fill all voids with the same insulation material as used on the adjacent pipe.

6. Where anchors are secured to chilled piping that is to be insulated, insulate the anchors the same as the piping for a distance not less than four times the insulation thickness to prevent condensation. Vapor seal insulation around anchors.

P. For Flanges, Unions, Valves, Anchors, Fittings for Cold Piping, Factory-fabricated removable and reusable insulation covers may be used.

Q. For piping insulation inside the building, coat pipe insulation ends with vapor barrier coating not more than six inches from each flange, union, valve, anchor or fitting.

1. Place insulation of the same thickness and conductivity as the adjoining pipe insulation (either pre-molded or segmented) around the item, butting the adjoining pipe insulation.

2. If nesting size insulation is used, overlap the insulation 2 inches or one pipe diameter.

3. Use loose fill mineral wool or insulating cement to fill the voids.

4. Elbows insulated using segments shall not have less than 3 segments per elbow. Insulation may be secured by wire or tape until finish coating is applied.

5. Apply two coats vapor barrier coating with glass tape embedded between coats. Overlap tape seams one inch. Extend the coating out onto the adjoining pipe insulation 2 inches.

6. Insulate anchors attached directly to the pipe for a sufficient distance to prevent condensation but not less than 6 inches from the insulation surface.
R. Insulate flexible connections at pumps and other equipment with unicellular plastic insulation, unless otherwise indicated.

S. At the option of the Contractor, premolded, one-piece polyvinyl chloride (PVC) fitting covers may be used in lieu of the embedded glass tape. Factory premolded insulation or field-fabricated insulation segments shall be used under the fitting covers. Blanket inserts may be used. Secure the covers with adhesive and vapor barrier tape with a vapor resistance of maximum 0.05 perm per ASTM E 96, or with tacks made for securing PVC covers. Then coat all tape seams and tacks with vapor barrier coating. Do not use premolded PVC fitting covers where exposed to weather.

3.06 ALL COLD EQUIPMENT

A. Insulate all equipment not indicated elsewhere to be insulated, which shall include but not be limited to the following:

1. Exposed ends of cooling coils not in a casing.

B. All equipment located in return air stream of air handling units or open to ceiling plenums shall be insulated with cellular glass blocks of not less than 2" thickness. All surfaces of the equipment and inside surfaces of the insulation shall be thoroughly coated with Insul-Coustics 405 mastic in a manner so that all voids are filled. The insulation shall be held securely in place with stainless steel wire or straps, and covered with stretched glass membrane with a tack coat of mastic. The insulation shall be finished with a coating not less than 1/2" thick of Weber's "Quik-Set" finishing cement trowelled to a smooth finish over 1 inch hexagonal wire mesh.

C. Equipment other than pumps, located outside of any return air stream and sealed off from any ceiling plenums: The equipment shall be insulated with 1" thick flexible, elastomeric thermal insulation applied in accordance with the manufacturer's recommendations and covered with two coats of Armaflex Finish. The insulation shall be FR/Armaflex by Armstrong.

END OF SECTION
SECTION 23 30 40

HEAT TRANSFER EQUIPMENT

PART 1 GENERAL

1.01 DESCRIPTION

A. The work covered by this section of the specifications shall consist of furnishing and installing all air units, water specialties, packaged heating and cooling and heating units, water heating systems, condenser water, and chilled water systems for this project.

B. Other sections of these specifications are a part of this Section. Refer to all sections for a complete description of the work.

1.02 SUBMITTAL

A. Shop drawings shall be submitted as specified in Section 230000. Shop drawings shall include sufficient information to prove complete compliance with the contract documents. Shop drawings on all items are required.

B. Submittals on coils may be submitted as part of the air handling unit submittal.

C. Shop drawings on all packaged units shall consist of manufacturer's literature and other information required to establish contract compliance. Wiring diagrams especially prepared for this project and showing all modifications required to interlock the unit as specified shall be submitted. The sensible and total cooling and/or heating capacity of each unit when operating at the specified conditions shall be clearly indicated.

D. Submit sound power levels for all air units with fan capacity exceeding 9000 CPM or having motors in excess of 5HP. Submit data on smaller units where the 2nd, 3rd or 4th band sound power level exceeds 65 dB. Data shall include discharge, radiated and intake.

1.03 QUALITY CONTROL

A. All cooling and/or heating coils shall be ARI certified.

B. Packaged units shall be UL labeled.

C. All packaged air conditioning units including heat pumps shall be tested for noise in a sound laboratory conforming to ASHRAE Std. 36 B 63. Published sound data shall be submitted with the shop drawings and shall be based on ASHRAE methods.

D. The capacity of all packaged units shall be tested and certified by ARI or AHAM.
E. All packaged equipment with air cooled condensing shall be suitable for operation at outdoor ambient temperature up to 120°F.

PART 2 PRODUCTS

2.01 STRAINERS

A. Basket type strainers shall be cast iron body, bolted cover, closed bottom strainer basket, with flanged connections and shall be McAlear No. 528 suitable for 150 psi working pressure, or approved equal.

B. Y-type strainers shall be brass body with brass baskets, with bottom blow-off connection, for 150 psi W.W.P., and shall be McAlear "S" or "F-1" or approved equal. Strainers 2 inches and smaller shall be screw pattern; strainers 2-1/2 inches and larger shall be flange pattern.

C. Suppliers of Comparable Products: Muller.

2.02 AUTOMATIC AIR VENTS

A. Automatic air eliminator valves for use on air separators shall be high capacity float type with back flow prevention feature to prevent air from being drawn into system. 125 psig working pressure at 240 degrees F, 3/4" inlet, 1/4" orifice, 3/8" discharge connection, self-cleaning, 2 psig minimum operating pressure, cast iron body, removable cover, bronze mechanism. Amtrol, Taco, Armstrong Pumps, Sarco, Hoffman or Armstrong Trap Co.

2.03 THERMOMETERS AND THERMOWELLS

A. Thermometers shall be installed at locations indicated on the drawings and as indicated herein. Thermometers shall be installed in a manner that they may be easily read from the floor and shall be the separable socket type. Thermometer wells shall be provided for each thermometer. The thermometer wells shall be constructed of brass and shall be provided with brass plugs and chains. All wells for insulated lines shall be provided with lagging extensions. The thermometers shall be for bottom or back connections as required for each reading and shall be as follows:

1. Thermometers for the condenser water or chilled water systems shall have range of 20 to 120°F.

2. Thermometers for all other systems shall be selected with scales so that "normal" temperature is in the mid range as approved by the Architect.

3. Thermometers shall be Treice, 9" scale, cast aluminum case and brass stem. Minimum 3-1/2" stem complete with separable brass socket well.

B. Thermometers shall be placed as shown on drawing details and at the following locations:

1. Supply and return to each water coil.

C. The following thermometer wells shall be installed in the piping system for sensors used by the Energy Management System. Coordinate all locations with the temperature controls subcontractor.

1. Supply and return to each water coil.

2.04 PRESSURE GAUGES AND TAPINGS (Water)

A. Tapings for pressure gauges shall be provided on the entering and leaving side of each pump and elsewhere as shown on the drawings or specified. Gauge tapings shall consist of a nipple welded or screwed into the piping, a gauge cock, nipple, and a brass cap. The gauge cocks shall be serviceable brass needle valves, Trerice No. 735-2. Cap shall be secured at tapping with a short section of brass chain. The exact location of gauge tapings shall be approved by the Engineer before installation.

B. Pressure gauge shall be installed on the supply side of each steam coil.

C. Gauges shall be the Bourdon tube type with a 4-1/2" white dial with black graduations and with aluminum case with glass front. The gauges shall be installed in a manner so that they may be easily read from the floor and each gauge shall be provided with a lever handle cock. Provide brass pressure snubber for each pressure gauge. Gauges shall be Trerice, unless otherwise noted:

1. All gauges shall be with a range or 0 to 100 psi, model 600C.

2. Pressure snubbers, model 872-2.

3. Provide additional gauge cocks for use with the Energy Management System as indicated on control diagrams.

D. Suppliers of Comparable Products: Ashcroft, Taylor.

2.05 COOLING AND HEATING COILS (Chilled and Hot Water)

A. General: The coils shall be of the water type. The coils in factory assembled air units shall be provided as a part of the air units by the unit manufacturer. The coils shall be constructed of copper fins mechanical bonded to seamless copper tubes with no more than 16 fins per inch. Extended headers outside of the air unit will not be allowed.
B. Water Heating Coils:

1. The coils shall be ARI certified.

2. Water coils shall have copper fins mounted on copper tubes. Fins shall have belled collars and shall be bonded to tubes by mechanical expansion. Headers and water connections shall have same end connections, manufactured of steel and coated with a corrosion resistant paint. **ALUMINUM FINNS ON COILS WILL NOT BE ACCEPTED FOR THIS PROJECT.**

3. Water connections up to 2" shall have male pipe threads and larger connections shall have plain end designed for welding. The headers shall be furnished with plugged tapings for venting and drainage.

4. Coil shall be factory leak tested at 350 psig air under water. Coil shall be rated for maximum working pressure of 200 psig.

5. The coils shall be of the type, size, and arrangement, capacity, etc. as indicated on the drawings.

6. Approved manufacturers: Trane, Air Enterprises, McQuay, or Carrier.

C. Water Cooling Coils

1. Water cooling coils shall be designed for chilled water cooling and shall be arranged to allow free expansion and contraction of the tubes and for free air venting from the coils. The coils shall be suitable for working pressure of not less than 200 psig. The copper tubing shall be rolled or brazed into the headers. A casing of not less than 16 ga. stainless steel shall enclose the coils and shall be provided with bolting flanges. The casing shall be arranged to prevent air bypassing the coils and reinforced as required to allow the coils to be stacked. Supports and reinforcing is required to prevent sagging of the tubes or frames even if the coils are supported only at the ends. Fins shall be not less than .009 inches thick. Tube walls shall be not less than .024 inches thick at all bends or other points subject to erosion and not less than .018 inches thick at all other locations. Each coil shall be provided with a manual air vent at the high point and a drain plug or connection at the low point. Cooling coils shall be not less than 4 rows deep and shall have not more than 120 fins per foot. Face velocity and pressure drop shall be not greater than that scheduled on the drawings.

2. The coils shall be ARI certified.

3. The coils shall be of the type, size, and arrangement, capacity, etc. as indicated on the drawings.

4. Approved manufacturers: Trane, Air Enterprise, McQuay, or Carrier.
D. Dry Cooler Coils

1. The evaporator coil shall be A-frame design with offset orientation. A stainless steel condensate drain pan shall be provided. Coil to be aluminum fins with electrofin or heresite coating and copper tubes.

E. Face and Bypass Steam Pre-Heating Coils

1. General: Coil capacities, pressure drops and selection procedures shall be certified in accordance with ARI Standard 410-72.

2. Fins shall be aluminum plate fin type with full fin collars for accurate spacing and maximum fin-tube contact. Fin spacing shall not be closer than 12 fins per inch unless otherwise shown on the submittal data and drawings. Fins shall be .0075” aluminum and shall be flat or pattern.

3. Tubes shall be copper, steam distributing tube type with outer tubes expanded into fin collars for permanent fin-tube bond and internal tubes expanded into header for permanent leak tight joint. Tube material shall be .025” x .625” copper.

4. Headers shall be round carbon steel.

5. Coils are to be tested to 250 p.s.i. air under water. Coils casings shall be installed level with tubes pitched internally in two directions within the casing. Tubes shall be tube-in-tube design.

6. Casing to be 16 gauge, continuous coated galvanized steel, stainless steel or aluminum as required with fins recessed into channels to minimize air bypass.

7. Coils sized to allow design CFM to flow under 700 FPM through coils.

8. Coils shall be bolted to holding wall and removable from the face. Access doors shall be designed to allow for removal of coil through door.

9. Coils are to be pre-piped with all manifolding, isolation valves, strainers and control valve stations ready for the steam and condensate utilities to be connected in the field by others. Reference drawings, schedules and piping specification for details.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. ALL EQUIPMENT shall be installed as recommended by the manufacturer. The equipment shall be cleaned, adjusted, balanced and placed into operation.
B. WATER COILS shall be installed as required to prevent trapping of air in the coil.

END OF SECTION
SECTION 23 81 23

COMPUTER ROOM AIR CONDITIONER UNIT (CRAC)

PART 1 GENERAL

1.01 SCOPE

A. Install owner provided computer room air conditioners and condensing units with piping and accessories as specified and indicated on attached schedule and drawings.

PART 2 PRODUCTS

2.01 ALL EQUIPMENT

A. All electrical equipment shall be UL listed and all gas equipment shall be AGA certified.

PART 3 INSTALLATION SCOPE

3.01 A. Install where shown on drawings Data Aire computer room air conditioners, piping, valves, controls etc. with accessories as specified and indicated on plans.

PART 4 FILTER INSTALLATION

4.01 A. Three sets of filters are provided with the CRACS. One set shall be installed for operation during construction and testing. The second set of filters shall be installed at time of final inspection and the third set of air filters shall be delivered to Owner prior to final acceptance of the project.

PART 5 INSTALLATION EXECUTION

5.01 OUTDOOR UNIT SUPPORT

A. Outdoor units shall be located and supported as indicated on drawings. Minor adjustments to exact location shall be coordinated with General Contractor and Architect.

5.02 INDOOR UNIT SUPPORTS AND VIBRATION ISOLATORS

A. Mechanical Contractor shall furnish and install neoprene-in-shear type vibration isolators for all indoor units. Isolator shall be Vibration Mountings and Controls, Inc. Type "R" or "RD" for floor mounted units and Type "RH" or "RHD" for suspended units, or equal by Mason Industries, Inc. Korfund, or Amber Booth. Isolators shall be sized and installed according to manufacturer’s recommendations for load and deflection. Mechanical Contractor shall furnish and install all supplementary steel, framing members, beam clamps, hanger rods, etc. as required to properly support units.

Computer Room Air Conditioner

23 81 23 - 1
5.03 CONDENSATE DRAINS

A. Provide a trapped copper condensate line from each indoor unit condensate pump to location indicated on drawings. Where no termination point is indicated on drawings, route condensate line to exterior of building and terminate 3" above finished grade.

END OF SECTION
SECTION 26 05 00
ELECTRICAL, GENERAL

PART 1 GENERAL

1.01 FEES

A. Fees for permits and inspections are included. Deliver permits and certificates to the Architect.

1.02 SITE VISIT

A. Prior to bidding, this Contractor shall visit the job site and shall familiarize himself with all conditions under which work is to be performed and shall include in his bid all labor, material and operations required for a complete job.

1.03 DRAWINGS AND SPECIFICATIONS

A. Drawings do not indicate all hardware and fittings. Examine all plans and specifications for the project and conditions at site and arrange work accordingly, furnishing required fittings and hardware without extra charge. If a conflict exists, the greater quantity or better quality, in the opinion of the Engineer, governs.

B. Drawings and specifications are complementary; work called for in either shall be provided as if called for by both.

1.04 CODES AND STANDARDS

A. Materials, equipment and installation shall conform to the requirements of the codes and standards (latest editions) listed below. In addition, all materials, equipment, and devices shall meet the requirements of the Underwriters' Laboratories, Inc. The label of, or listing by, the Underwriters' Laboratories, Inc. will be accepted as conforming with this requirement. In lieu of the label or listing, the Contractor may submit independent proof satisfactory to the Engineer that the materials, equipment or devices conform to the published standards, including methods of tests, of the Underwriters' Laboratories, Inc. (UL), National Electrical Code (NEC), National Electrical Safety Code, American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), Institute of Electrical and Electronics Engineers (IEEE), National Electrical Manufacturers Association (NEMA), Illuminating Engineering Society (IES), National Fire Protection Association (NFPA), National Electrical Contractors Association Standard Practices for Good Workmanship in Electrical Contracting (NECA 1), International Building Code (IBC) and Americans with Disabilities Act (ADA).

1.05 BASIC MATERIALS AND METHODS

A. All materials installed shall be new, clean, in good condition and shall meet applicable provisions of codes and standards listed above.
B. Workmanship shall be in accordance with best practice.

1.06 SCOPE

A. Provide all labor, equipment, material, and operations required for complete, safe and quietly-operating electrical systems in accordance with specifications and drawings and subject to terms and conditions of the contract.

B. The work includes:

1. Grounding in accordance with specifications, drawings and codes;
2. Power supply connections to mechanical equipment;
3. Cutting, patching, trenching and backfilling as required for provision of the work;
4. Fireproofing and caulking as indicated;
5. Seismic restraint for electrical system components;
6. Partial demolition of existing mechanical equipment.

1.07 CUTTING AND PATCHING

A. Provide under this contract all cutting and patching of walls, floors, partitions, ceilings, etc. required for proper installation of the new system.

B. Provide patching to match the existing finish of the building. Do not cut joists, beams, girders, columns, or other structural members without written permission from Owner.

C. Ceiling tile shall be removed and reinstalled by a qualified franchised acoustical tile contractor regularly engaged in this type of work. Replace damaged tile with new tile of color and pattern to match existing tile. Submit samples for approval.

D. Relocation of existing conduit, equipment, wiring, etc. as required for installation of new system is included in this work. Perform all work in accordance with specifications for new work of the particular type involved.

1.08 SEISMIC RERAINTS

A. Provide seismic restraint of new electrical systems and equipment as required by 2012 International Building Code (IBC). Include in bid all required seismic design, performed by a registered South Carolina Professional Engineer, as required for compliance with IBC. Provide stamped and sealed calculations for all connections of equipment to structures as part of shop drawing submittals. Additionally, shop drawings shall include floor plans, sections, and elevations as required to indicate location, type connection and type of all components provided. Seismic restraint products shall be by Cooper/B-line, Mason Industries, Unistrut Corporation, Grinnell Corporation, Amber Booth, Peabody or approved equal.
1.09 DAMAGES

A. Cost of repairing damage to building, building contents, and site during construction and guarantee period resulting from this work is a part of this contract.

1.10 MATERIAL AND EQUIPMENT

A. New and as specified, or approved equal.

B. Where several units of one type of equipment are used, all units shall be products of the same manufacturer.

C. Any increase in the cost of this work, resulting from substitution of any product or products for those specified is part of this contract. Such work shall be accomplished in an approved manner at no extra cost to the Owner.

1.11 OPERATING INSTRUCTIONS, PANELBOARD DIRECTORIES AND NAMEPLATES

A. Instruct owner in operation of all systems.

B. Install in each panelboard a single-sided plastic-covered, typewritten circuit directory in metal frame. Indicate name, address and service telephone number of installer. Directory shall list the load served and the location of the load for each breaker.

C. Nameplates Provided by Contractor: On all panelboards, disconnect switches, transformers and enclosures, provide engraved plastic laminate nameplates. Unless otherwise noted, nameplates to be 1/16" thick plastic with 1/4" high white letters on black background. Attach nameplates with epoxy cement or screws. On main switchboard/panelboard and feeder distribution panelboards, provide nameplate for each circuit breaker.

D. Nameplates Provided by Equipment Manufacturers: All switchboards, panelboards, transformers, safety switches and the like shall be provided with engraved metal nameplates which state all industry-standard required data about the labeled equipment. Nameplates shall be affixed with screws or rivets. The use of paper nameplates only will not be accepted.

1.12 SHOP DRAWINGS

A. The Engineer will review and take appropriate action on shop drawings, product data, samples, and other submittals required by the Contract Documents. Such review shall be only for general compliance with the design and with the information given in the Contract Documents. It shall not include review of quantities, dimensions, weights, fabrication processes, construction methods, coordination with the work of other trades, or construction safety precautions, all of which are the sole responsibility of the Contractor. Engineer's review shall be conducted with reasonable promptness consistent with sound professional practice. Review of a specific item shall not indicate acceptance of an assembly of which the item is a component. The Engineer shall not be required to review and shall not be responsible for any deviations from the Contract Documents not
clearly noted by the Contractor, nor shall the Engineer be required to review partial submissions or those for which submissions for correlated items have not been made.

B. Prior to submittal of shop drawings to the Engineer, the General Contractor and the Electrical Subcontractor shall review and approve shop drawings. Shop drawings which have not been reviewed and approved in writing by the Electrical Subcontractor will not be reviewed by the Engineer. Electrical Subcontractor shall state in writing on shop drawings, any proposed deviations from contract documents. Such deviations, if not stated in shop drawings submittal, shall be the sole responsibility of the Electrical Subcontractor.

**NOTE:** IN ADDITION TO THE GENERAL CONTRACTOR’S APPROVAL AND STAMP, THE FIRST PAGE OF EACH SHOP DRAWING SUBMITTAL SHALL CONTAIN THE WORDS "APPROVED" OR "APPROVED AS NOTED," AND SHALL BE SIGNED, AND DATED BY THE ELECTRICAL SUBCONTRACTOR BEFORE THE ENGINEER WILL REVIEW THEM.

C. Shop drawing submittal shall contain a cover sheet listing:

1. Project name;
2. Contractor's approval stamp and signature as noted above.

Attach fixture catalog pages (cuts) to cover sheet.

D. Electrical subcontractor shall submit for review by the Engineer detailed shop drawings of all equipment and all material listed below. All submittal data shall be submitted at one time. Partial submittals will not be reviewed by the Engineer. No material or equipment for which Engineer's review is required shall be delivered to the job site or installed until this contractor has in his possession the reviewed shop drawings for the particular material or equipment. The shop drawings shall be complete as described herein. This Contractor shall furnish the number of copies specified by the Architect or six (6) copies of shop drawings if no number is specified by the Architect.

E. Shop drawings submitted for review shall be detailed, dimensioned drawings or catalog pages showing construction, size, arrangement, operating clearances, performance characteristics and capacity.

F. Samples, drawings, specifications, catalogs, submitted for review shall be properly labeled indicating specific service for which material or equipment is to be used, section and article number of specifications governing, contractor's name, and project name.

G. Catalogs, pamphlets, or other documents submitted to describe items on which review is being requested, shall be specific and identification in catalog, pamphlet, etc. of item submitted shall be clearly made in ink. Data of a general nature will not be accepted.

H. Review rendered on shop drawings shall not be considered as a guarantee of measurements of building conditions. WHERE DRAWINGS ARE REVIEWED, SAID
REVIEW DOES NOT MEAN THAT DRAWINGS HAVE BEEN CHECKED IN DETAIL; SAID REVIEW DOES NOT IN ANY WAY RELIEVE THIS CONTRACTOR FROM HIS RESPONSIBILITY OR NECESSITY OF FURNISHING MATERIAL OR PERFORMING WORK AS REQUIRED BY THE CONTRACT DRAWINGS AND SPECIFICATIONS.

I. Failure of contractor to submit shop drawings in time for review by Engineer with reasonable promptness consistent with sound professional practice shall not entitle him to an extension of contract time, and no claim for extension by reason of such default will be allowed.

J. The Contractor shall submit shop drawings for the following materials and equipment for review by Engineer: See “Note” in paragraph B, above.

1. Safety switches
2. Basic materials: wire, conduit, fittings, wiring devices

1.13 RECORD DATA

A. Preserve one set of approved shop drawings and deliver to Owner prior to substantial completion of the work. Owner's shop drawings shall be bound in a 3-ring binder of good quality, with stiff vinyl or cloth front and back. Number of copies shall be as directed by Architect.

1.14 RECORD DRAWINGS

A. Contractor shall maintain on the job site one complete set of drawings for this project. All changes authorized by the Engineers and/or the Owner as to the locations, sizes, etc. of equipment, conduit, fixtures, and/or other material and equipment shall be indicated in red pencil on the drawings as the work progresses. At the completion of the project, Contractor shall obtain a complete set of reproducibles of the drawings, and shall transfer all changes to these reproducibles. The number of record prints specified by the Architect shall be delivered to the Architect.

1.15 COORDINATION WITH OTHER TRADES

A. Coordinate with other trades to conceal electrical work and provide electrical work in correct locations for each piece of mechanical or electrical equipment connected.

B. Conceal outlets for all water coolers, mechanical equipment, etc., in finished areas. Obtain roughing diagrams for all devices and install electrical work according to diagrams.

C. Locate all outlets at uniform heights to suit block coursing. Heights shown in drawings may be varied to suit coursing, but shall in all cases comply with codes.

1.16 ELECTRICAL WORK FOR MECHANICAL SYSTEMS
A. Provide complete power wiring and connections for mechanical systems specified under Division 23. This work includes all raceways, conductors, outlet and pull boxes, line voltage on-off switches where indicated and disconnecting means as indicated and required by applicable codes. Where magnetic motor starters, variable frequency drives or other controllers are furnished by others, install and wire complete; where controllers are provided already mounted on equipment, wire complete. In all cases provide power wiring through controller to load; do not reduce. Make all connections and color code per this division. Unless noted otherwise, safety switch enclosures shall be NEMA Type 3R outdoors and in wet locations; NEMA Type 1, elsewhere. Not included in this division is temperature control wiring, equipment control wiring, and interlock wiring required to operate the mechanical system, except as specified below for water heaters. Refer to Division 23 for equipment provided under that Division.

1.17 EQUIPMENT FOUNDATIONS AND MOUNTING

A. Unless otherwise noted, set all floor and ground mounted equipment on minimum 6” high concrete pads reinforced with 6 x 6, 10/10 WWM. Epoxy dowel #4 rebar 12” on center along entire perimeter of pad as required to tie pad into base slab. Pads to be approximately 6” larger than equipment base and have 1” x 1” chamfer on all edges. Pads to have carborundum brick rubbed finish. Surface finish to be uniformly smooth.

B. For generators, large transformers and other large or heavy equipment, provide foundation and equipment pads as directed by equipment vendor and to suit soil conditions.

C. For utility pad-mounted transformers, provide pad in accordance with Utility’s standard construction details.

D. For transformers, provide isolating pads between equipment and foundation or structural support. Pads shall be formed by a minimum of two layers of 1/4”-5/16” thick neoprene, ribbed or waffled on both sides. Connect circuits through flexible conduit of 24” length to prevent transmission of vibration to structure or raceway system.

E. Provide all required mounting devices, hardware, supplementary steel and other materials to mount equipment. Mountings shall be secured to structure and seismically braced to comply with codes. Where additional structural members such as columns, beams, and the like are required to mount equipment, they shall be provided at no additional cost to the Owner.

1.18 TESTS, PERFORMANCE

A. Upon completion of work, the system shall be free of faults, including short circuits, grounds and open circuits and loads shall be balanced across phases to obtain minimum neutral current in all feeders and branch circuits. Test systems as required in the presence of the Engineer or his representative, and operate to comply with applicable codes and contract documents.

B. For all fire safety systems, test systems completely and exercise all user stations, initiation/activation stations and warning/output devices prior to substantial completion.
by the Engineer. Furnish certificate to Engineer stating that systems are complete and operational and have been operated by the Contractor as specified above.

C. All costs associated with correction of deficiencies in the work shall be borne by the Contractor. Defective material and equipment shall be replaced; do not repair.

D. All devices which must be adjusted or set to operate on a schedule (time clocks, program mechanisms, etc.) shall be set prior to substantial completion to operate on schedules directed by the Owner.

E. All adjustable breakers shall be adjusted in field to settings determined by the engineer.

1.19 WARRANTIES

A. The Contractor Agrees:

1. To correct defects in workmanship, materials, equipment, and operation of all systems for a period of one year from the date of Substantial Completion.

2. To remove any item not specified or given written approval and replace it with an approved item.

3. That all systems provided will safely, quietly, and efficiently operate in accordance with the design.

B. This does not supersede manufacturer’s warranties which may extend beyond one year.

1.20 CONSTRUCTION SEQUENCE

A. The Contractor is cautioned that the project may be constructed in stages to accommodate the owner's use of the building. This contractor shall verify requirements prior to bidding and shall cooperate in all respects with other contractors and trades on the job to carry out the work with minimum disruption of both the owner's requirements and construction of the project.

1.21 DETAILS

A. The details and sketches in the drawings are construction standards applicable to this project.

B. The contractor shall comply with details as applicable to the work indicated and shall retain on the job site at all times, a complete set of drawings and specifications.

1.22 DEFINITIONS

A. In this division of the specifications and accompanying drawings, the following definitions apply:
1. Provide: To purchase, pay for, transport to the job site, unpack, install and connect complete and ready for operation; to include all permits, inspections, equipment, material, labor, hardware and operations required for completion.

2. Install: To receive from another contractor, the owner or another entity and install complete and ready for operation. Unless otherwise indicated, receipt is assumed to be at the job site.

3. Furnish: To purchase, pay for and deliver to the job site for installation by others.

4. The contractor is cautioned that “furnish” and “install” require coordination with others. Such coordination shall be accomplished prior to bidding and bid amounts shall include all required labor, material and operations for completion of all items and systems specified and indicated.

5. As Indicated: As shown in drawings.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION
SECTION 26 05 10

ELECTRICAL, DEMOLITION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The following apply to the work under this Section:
   1. Section 26 05 00, Electrical, General
   2. Section 26 20 00, Interior Wiring Systems

1.02 SCOPE

A. Provide all labor, material and operation required for removal of existing power connections to existing mechanical equipment as indicated.

B. Bidders shall visit the site of the work prior to bidding and shall include in bid all work required to provide new work and to modify existing work as required to continue in operation.

C. Contractor shall examine demolition and new work plans for all trades and include in bid all rework and/or relocation of existing raceway, junction boxes, panelboards, safety switches, devices, wiring systems and all other related electrical equipment as required to accommodate new construction.

D. Electrical demolition work generally includes:
   1. Any existing abandoned wiring systems in ceiling space, crawl space, attic or similar cavities of the work areas of the building, including wire, raceways, boxes and supports as indicated.
   2. Existing electrical work for mechanical equipment being removed by others.

E. Include in bid all work required for temporary wiring and associated electrical work required to maintain existing systems in service during demolition phase.

F. All interruptions in electrical systems (power, lighting, communication, fire alarm and other systems) as required for this work shall be coordinated with and approved by Owner prior to performing work. Notice shall be provided to Owner in writing a minimum of 48 hours in advance, but not less than the time specified in other portions of Contract Documents.

G. The intent of this specification is to obtain removal of the existing electrical system to the extent required to enable the Owner to identify, service, repair or modify the new wiring system efficiently and safely.
1.03 STANDARDS

A. Demolition work shall comply with ANSI A10.6, NFPA 241 and all applicable local, state and federal standards and guidelines.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that utilities in work area have been disconnected and capped as required.

B. Survey existing conditions and correlate with demolition and new work indicated in Contract Documents to determine extent of demolition required.

C. When unanticipated mechanical, electrical, environmental or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Provide prompt written notice to Engineer of any conflicts.

3.02 DEMOLITION

A. Owner shall retain first right of refusal on all demolished wiring and electrical equipment being demolished. Prior to beginning demolition work, contractor shall walk through demolition area with Owner’s representative and identify items to be removed and turned over to Owner. Contractor shall carefully remove, protect and store items to be turned over to Owner and deliver to Owner at location on site as directed by Owner.

B. Maintain services and systems indicated to remain and protect them against damage during demolition process.

C. All devices indicated as to remain or to be relocated shall be protected against damage during demolition process and cleaned prior to being restored into service.

D. Contractor shall patch and paint to match adjacent finishes all locations resulting from demolition at which new work is not installed, as required under Section 26 05 00, Electrical, General.

E. Provide temporary barricades, dust barriers and other protection required to prevent injury to people and damage to building contents, adjacent area of building and facilities to remain.

3.03 DISPOSAL OF DEMOLISHED MATERIALS

A. Demolished material shall be promptly removed from site.

B. Remove and transport materials in a manner that will prevent contamination or damage to adjacent surfaces and areas.

C. Burning of demolished materials will not be permitted on site.
D. All materials shall be properly and legally disposed of. Contractor is responsible for all handling, storage, transportation and disposal fees.

3.04 CLEANING

A. Clean adjacent structures and improvements of dust, dirt and debris caused by demolition operations.

B. Return adjacent areas to condition existing before demolition operations began.

END OF SECTION
SECTION 26 20 00

INTERIOR WIRING SYSTEMS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Section 26 05 00, Electrical, General, applies to the work under this section.

1.02 SCOPE

A. Provide interior wiring systems complete and ready for operation, as indicated, specified herein and in compliance with applicable codes and standards.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Materials of like type shall be manufactured by the same company with the exception of lighting fixtures.

B. Panelboards, circuit breakers, safety switches, transformers, busways, motor starters, contactors and the like: General Electric, Square D, Cutler-Hammer, or approved equal.

C. Fittings, Condulets, Boxes and the like: Steel City, Thomas and Betts, O-Z Electrical Manufacturing Company, Appleton, Efcor, Crouse-Hinds, Garvin Industries, or approved equal.

D. Conductors and Cables: Alpha Wire Company, Belden, Cerro Wire, Southwire Company, General Cable or approved equal.

E. Cable Markers: 3M Company, E-Z Code, Brady, or approved equal.

F. Connectors, Lugs and Terminals and the like: 3M Company, Ideal, Thomas and Betts, O-Z Electrical Manufacturing Company, or approved equal.

G. Wiring Devices and the like: Best Specification Grade; Arrow Hart/Cooper, Hubbell, Legrand/P&S, Leviton, or approved equal.

H. Fuses: Bussman, Gould, Littelfuse, or approved equal.

I. Grounding Devices, Rods and the like: Cadweld, Thomas and Betts, Appleton, Erico, O-Z Electrical Manufacturing Company, or approved equal.

J. AC and MC Cable: Only permitted for fixture “whips”, maximum 6’ length.

2.02 CONDUIT AND FITTINGS
A. Rigid Steel Conduit (Zinc-Coated): ANSI C80.1.

B. Rigid Nonmetallic Conduit: Not Permitted.

C. Intermediate Metal Conduit (IMC): UL 1242, zinc-coated steel only.

D. Electrical Metallic Tubing (EMT): ANSI C80.3.

E. Flexible Metal Conduit: UL 1.
   1. Liquid-Tight Flexible Metal Conduit (Steel): UL 360.

F. Fittings for Metal Conduit, Electrical Metallic Tubing, and Flexible Metal Conduit: UL 514. All ferrous fittings shall be cadmium- or zinc-coated in accordance with UL 514.
   1. Fittings for rigid metal conduit and IMC shall be threaded type. Split couplings are not acceptable.
   2. Fittings for electrical metallic tubing (EMT) shall be the compression type.


H. Electrical Nonmetallic Tubing (ENT): Not permitted.

I. Refer to Section 28 31 10 for fire alarm systems color requirements.

2.03 OUTLET BOXES AND COVERS

A. UL 514, cadmium- or zinc-coated if of ferrous metal.

B. Provide outlet boxes of size and type required by NEC, and in no case smaller than the following:
   1. Boxes for lighting fixtures: 4" octagonal x 1-1/2" deep, or 4" x 4" x 1-1/2"
   2. Boxes for Switches and Receptacles: 3" x 2" x 2-3/4" or 4" x 4" x 1-1/2" with plaster ring to suit construction
   3. Communications Systems Boxes: 4" x 4" x 2-1/4"

C. Provide suitable extensions, rings or subcovers set to come flush with the finished surface in which boxes are mounted.

D. Boxes for exposed raceway shall be threaded-hub cast metal, sizes as specified above.

2.04 CABINETS, JUNCTION BOXES, AND PULL BOXES
2.05 WIRES AND CABLES

A. Wires and cables shall meet the applicable requirements of NFPA 70 and UL for the type of insulation, jacket, and conductor specified or indicated. All wire and cable shall be new, with size, grade of insulation, voltage and manufacturer's name permanently imprinted on outer covering at regular intervals, and delivered to the job site in complete coils and reels.

B. Conductors: Conductors No. 10 AWG and smaller shall be solid, and those No. 8 AWG and larger shall be stranded. Unless indicated otherwise, conductor sizes shown are based on copper. All conductors shall be copper.

C. Minimum Conductor Sizes: Minimum size for branch circuits shall be No. 12 AWG; for Class 1 remote-control and signal circuits, No. 14 AWG; and for Class 2 low-energy remote-control and signal circuits, No. 16 AWG. All 120 v. branch circuits exceeding 100' in length and all 277 v. branch circuits exceeding 250' in length shall be No. 10 AWG, minimum.

D. Color Coding: Provide for all service, feeder, branch, control and signaling circuit conductors. Color shall be green for grounding conductors, and white for neutrals, except where neutrals of more than one system are installed in same raceway or box, the neutral of the higher-voltage system shall be white with a yellow stripe, or shall be gray. The color of the ungrounded conductors in different voltage systems shall match existing.

E. Insulation: Unless specified or indicated otherwise, or required to be otherwise by NFPA 70, all power and lighting wires shall be 600-volt, Type THHN, THWN, or XHHW; remote-control and signal circuits shall be Type TW, THHN, TF, THWN or XHHW.

F. Bonding Conductors: ASTM B 1, solid bare copper wire for sizes No. 8 AWG and smaller; ASTM B 8, Class B, stranded bare copper wire for sizes No. 6 AWG and larger.

G. Variable Frequency Drive (VFD) Cable:

1. Provide VFD Cable for connection between all variable frequency drives and motors.

2. Cable shall comply with ICEA Standard S-73-532, UL 1685 and IEEE 1202/383 Flame Test. TC-ER cables shall comply with UL 44 and UL1277; stranded copper conductors with ASTM B-3 and B-8.

3. Cable shall be designed and manufactured specifically for application with variable frequency drives, shall be copper and include appropriate ground and symmetrical shielding conductors.


I. Nonmetallic-Sheathed Cable: Not permitted.
2.06 ELECTRICAL CONNECTIONS

A. Comply with NEC Article 110-14.

B. All termination devices, such as connectors, splicing devices, equipment terminals, device terminals and the like shall be rated and listed for operation at 75 degrees C.

2.07 SPLICES AND TERMINATION COMPONENTS

A. UL 486A and UL 486B, as applicable for wire connectors, and UL 510 for insulating tapes. Connectors for wires No. 10 AWG and smaller shall be insulated pressure-type in accordance with UL 486A or UL 486C (twist-on splicing connector). Provide solderless terminal lugs on stranded conductors.

B. Splices and/or taps for #8 and larger conductors shall be crimp type by T&B, Burndy, Oz, or approved equal; or Ilsco KUP-L-Tap®, ClearTap, or approved equal.

2.08 DEVICE PLATES

A. Provide UL listed, one-piece device plates for outlets and fittings to suit the devices installed. Plates on unfinished walls and on fittings shall be of zinc-coated sheet steel or cast metal having round or beveled edges. Plates on finished walls shall be urea or phenolic, minimum 0.10 inch wall thickness, and shall be the same color as the receptacle or toggle switch with which it is mounted, or shall be satin finish stainless steel or brushed-finish aluminum, minimum of 0.03 inch thick as directed by Architect. Screws shall be machine type with countersunk heads in a color to match the finish of the plate. The use of sectional type device plated will not be permitted. Plates installed in wet locations shall be gasketed. Device plates for telephone outlets shall be as specified in Section 27 05 00. All plates shall be oversize type.

2.09 SWITCHES

A. Disconnect Switches: NEMA KS1. Provide heavy duty, fusible type. General duty and non-fusible switches are not permitted.

1. Operating mechanisms shall be of the quick-make, quick-break type, with arc-suppressing characteristics.

2. Enclosures shall be NEMA 1 indoors and NEMA 3R outdoors and in wet locations unless otherwise indicated, equipped with cover interlock and provisions for padlocking operating handle in OFF position. Safety switches shall be by the same manufacturer as panelboards.

2.10 PANELBOARDS

A. UL 67 and UL 50. Panelboards for use as service disconnecting means shall additionally conform to UL 869. Panelboards shall be circuit breaker equipped unless indicated otherwise. Design shall be such that any individual breaker can be removed without
disturbing adjacent units or without loosening or removing supplemental insulation supplied as a means of obtaining clearances as required by UL. Where “space only” is indicated, make provisions for the future installation of a breaker sized as indicated. All panelboard locks included in the project shall be keyed alike. Directories shall be typed to indicate load served by each circuit and mounted in a holder behind transparent protective covering. Directory listing for each breaker shall list the type load served (lighting, receptacles, etc.) and location of load (room name, room number, etc.)

B. Panelboard Buses: Support bus bars on bases independently of the circuit breakers. Main buses and back pans shall be designed so that breakers may be changed without machining, drilling, or tapping. Provide an isolated neutral bus in each panel for connection of circuit neutral conductors. Provide a separate ground bus marked with a green stripe along its front and bonded to the steel cabinet for connecting grounding conductors.

C. Circuit Breakers: Fed. Spec. W-C-375 thermal magnetic type with interrupting capacity as indicated or of 22,000 amperes symmetrical minimum. Breaker terminals shall be UL listed as suitable for the type of conductor provided. Plug-in circuit breakers shall be provided only where indicated in drawings.

1. Multi-pole Breakers: Provide common-trip type with a single operating handle. Breaker design shall be such that an overload in one pole automatically causes all poles to open. Maintain phase sequence throughout each panel so that any three adjacent breaker poles are connected to Phases A, B, and C, respectively.

2. Circuit Breaker with Ground-Fault Circuit Interrupter: UL 1053 and NFPA 70. Provide with “push-to-test” button, visible indication of tripped condition, and ability to detect a current imbalance of approximately 5 milliampere.


4. Breakers Used as Switches for 120-Volt Fluorescent Fixtures: Breakers shall be marked “SWD” in accordance with UL 489.

5. Breakers used to serve refrigeration and air conditioning compressors shall be type “HACR.”

2.11 FUSES

A. Provide a complete set of fuses for each fusible device provided. Time-current characteristics curves of fuses serving motors or connected in series with circuit breakers or other circuit protective devices shall be coordinated for proper operation; submit coordination data for approval. Fuses shall have a voltage rating not less than the circuit voltage.

B. Cartridge Fuses, Current-Limiting Type (Class R): UL 198E, time-delay type. Associated fuseholders shall be Class R only.
C. Cartridge Fuses, Current-Limiting Type (Classes J and L): UL 198C, Class J for 0 to 600 amps and Class L for 601 to 6000 amps.

2.12 GROUNDING AND BONDING EQUIPMENT

A. UL 467. Ground rods shall be copper-encased steel, with minimum diameter of 3/4" and minimum length of 10 feet.

PART 3 EXECUTION

3.01 RACEWAYS

A. Provide raceways for all conductors and cables. See drawings for raceway types approved for various locations and applications in the project.

B. Provide flexible metal conduit for connection to rotating or vibrating equipment. In all potentially wet locations, provide waterproof flexible conduit. In no case shall length of flexible conduit exceed 3 feet, except for transformers, where length shall not exceed 2 feet. Support in accordance with NEC and as approved by Engineer.

C. Contractor shall size pull and junction boxes. Comply with requirements for dimensions and conduit spacings as defined in the NEC Article 314.

D. Raceways shall be continuous between outlets and enclosures. Bond raceway system as described in drawings and grounding specifications, and make all connections wrench tight for electrical continuity. Connect raceways at boxes and enclosures using locknuts and bushings. Provide insulating bushings with grounding lug on all raceways one inch and larger.

E. Install raceways generally as follows:

1. Run concealed raceways in straight lines with long sweep bends and offsets.

2. Where raceways turn up out of floor, curved portion shall not be visible.

3. Run exposed raceways parallel and perpendicular with building lines. Strap with two-hole flat straps; do not use minarallac straps.

4. Support raceways within 3' of each outlet box, fitting, or enclosure, and at 10' intervals. Use malleable iron or stamped steel clamps for branch circuit raceways; use pipe hangers for feeder raceways. Do not hang conduit with wire, perforated strap, or nails.

5. Cut all joints square, thread, ream and draw tight. Make bends and offsets with standard conduit ells or with an approved bender or hickey.

6. No more than three quarter-bends equivalent in any run.

7. Cap raceway ends to prevent entrance of debris during construction. Cap with approved pennies, plastic caps or covers; do not tape.
8. Complete raceway installation and clean thoroughly before pulling conductors.

9. Where conduits pass through fire-rated walls and/or floors, provide a UL-listed through-penetration assembly with fire rating equal to wall or floor penetrated. Materials shall be by 3M Company or equal. Each assembly shall be specific to the penetrating device, e.g., single conduit, multiple conduits, busway, etc. and shall be specific to the wall or floor construction penetrated, e.g., concrete, gypsum board on wall studs, etc. Install assemblies in accordance with material manufacturer's instructions and UL Building Materials Directory, latest edition.

10. Install expansion fittings with copper bonding jumpers in conduit runs which cross building expansion joints.

11. Ferrous metal raceways, cable trays, cablebus, auxiliary gutters, cable armor, boxes, cable sheathing, cabinets, metal elbows, couplings, nipples, fittings, supports, and support hardware shall be suitably protected against corrosion inside and outside (except threads at joints) by a coating of approved corrosion-resistant material (Thomas & Betts, Kopr-Shield, or equal). Where corrosion protection is necessary and the conduit is threaded in the field, the threads shall be coated with an approved electrically conductive, corrosion-resistant compound.

F. Install pull boxes as shown in drawings and as required to pull conductors without damage to insulation. Provide pull boxes in accessible locations only, and size in accordance with NEC.

G. Unless otherwise indicated, underground conduits may be Schedule 40 PVC or coal-tar painted IMC or coal-tar painted GRS conduit at the contractor's option. All elbows shall be GRS type. Maintain conduit spacing in compliance with NEC.

H. Cover all raceways below grade and in concrete slabs with two brushed applications of a coal tar base coating conforming to MIL-C-18480. In lieu of asphalt coated conduit, Schedule 40 PVC conduit may be used for branch circuit raceways (conduits 1” and smaller), provided that grounding conductors are provided in all runs sized per NEC.

I. At Contractor’s option, Schedule 40 PVC conduit may be used for underground feeder raceways, provided that GRS elbows and grounding conductors are provided for all runs. Exposed conduits shall be metallic as specified. All feeder and branch circuit raceways shall be metallic and shall be provided with green ground conductor in accordance with NEC Article 517, redundant grounding requirements.

J. All underground/in-slab raceways shall transition to GRS/IMC prior to penetrating slab. No PVC raceway allowed above slab.

K. Install raceways of sizes shown in drawings and comply with Table 1 of NEC (latest edition). In case of conflict, install larger size.

L. Provide in each empty raceway a pull cord or wire, identified with a cardboard tag as to location of equipment or outlet fed by conduit.
3.02 OUTLET, SWITCH, AND JUNCTION BOXES, FITTINGS

A. Provide outlet and junction boxes as required for power, lighting, and communications systems as shown in drawings.

B. Boxes shall be held securely in place by being imbedded in masonry, or shall be secured to a fixed structural unit such as a stud or joist.

3.03 CONDUCTORS

A. Provide conductors in raceways as shown in drawings for service, feeders and branch circuits.

B. Conductors No. 8 and larger shall be connected to equipment by means of pressure type mechanical lugs. Where multiple conductors are connected to the same terminal each conductor shall be provided with an individual lug.

C. Soldered splices shall be made mechanically secure before soldering.

D. Wire and cable shall be suitably protected from weather during storage and handling and shall be in good condition when installed.

E. Join conductors with approved connectors, or by soldering, brazing or welding. Tape all connections or cover with approved prefabricated insulating devices to provide insulation resistance at the connection equal to that of the wire. Make splices in boxes or fittings only.

F. Do not pull conductors before completion of masonry, concrete and other trades which generate dust and debris. See raceways section, above.

G. Install and terminate variable frequency drive cable in accordance with manufacturer guidelines. Shield and ground conductors shall be securely bonded to motor case and drive enclosure to ensure control of ground current and electrical noise.

3.04 PANELBOARDS

A. Where shown on drawings and indicated in riser diagram, provide panelboards of the types and sizes indicated. Panelboards shall be installed with top of cabinet 72" above finished floor.

B. Comply with NFPA-70, Section 408, for installation requirements and with other applicable sections for clearances. Lay out all equipment rooms in advance of roughing and notify Engineer immediately, in writing, if interferences are encountered or if code requirements cannot be met with equipment proposed.

C. Provide multi-pole breakers of common-trip type to simultaneously disconnect all ungrounded conductors in multiwire branch circuits.

3.05 SAFETY SWITCHES
A. Provide heavy duty, fusible safety switches at locations shown on drawings, and in accordance with NEC requirements. Provide nameplates on switches as specified in Section 26 05 00. Wording shall identify the load which switch disconnects.

3.06 GROUNDING

A. Provide grounding system to comply with NEC, as shown on drawings and as specified.

B. All ground rods and fittings used shall be free from paint, grease, and other poorly conducting material, and contact surfaces shall be cleaned thoroughly to ensure good metal-to-metal contact.

C. Install bonding jumpers between all panelboards and feeder raceways connected thereto; across pull box and raceway expansion joints and across water meters located within buildings.

D. All connections to grounding conductors shall be accessible for inspection and shall be made with solderless connectors brazed or bolted to the equipment or structure to be grounded. Unless otherwise indicated in drawings, grounding conductors within raceway system shall be installed in exposed rigid steel conduit with both conductor and conduit bonded at each end. Do not cover grounding girdle until Engineer has observed connections.

E. Provide a ground wire in all circuits sized per NEC Table 250-122 as applicable.

F. Provide in all runs of flexible conduit a separate grounding conductor sized per NEC Table 250-122.

END OF SECTION