



PROJECT MANUAL

**COLUMBIA HALL ELEVATOR MODERNIZATION
UNIVERSITY OF SOUTH CAROLINA**

**STATE PROJECT NO: H27-6008
A/E COMMISSION NO. 12109**

NOVEMBER 15, 2012



**JUMPER CARTER SEASE/ARCHITECTS, P.A.
412 MEETING STREET * WEST COLUMBIA, S.C. 29169**

DIVISION 0 **BIDDING AND CONTRACT DOCUMENTS**

SE-310	Request for Advertisement/Invitation for Construction Bids (07/20/11)
AIA-A701-1997	Instructions to Bidders
00201-OSE	Standard Supplemental Instructions to Bidders (07/28/11)
AIA-A310-2010	Bid Bond (2010 Edition)
SE-330	Standard Bid Form (09/21/11) (Refer to Section 012000 "Schedule of Completion and Liquidated Damages" for section 9 "Time of Contract Performance and Liquidated Damages")
AIA-101-2007	Standard Form of Agreement Between Owner & Contractor
00501-OSE	Standard Modifications to AIA A101 (07/11/11)
AIA-A201-2007	General Conditions of the Contract for Construction
00811-OSE	Standard Supplementary Conditions (09/07/11)
-----	USC Supplemental General Conditions for Construction Projects
SE-355	Performance Bond (2011)
SE-357	Labor & Material Payment Bond (08/09/11)
SE-480	Construction Change Order (2011)
-----	Contractor's One Year Guarantee

DIVISION 1 **GENERAL REQUIREMENTS**

011000	Summary
011010-A	Special Conditions
012000	Schedule of Completion and Liquidated Damages
012300	Alternates
012400	Contract Modification Procedures
012500	Substitution Procedures
012500A	Substitution Request Form
012900	Payment Procedures
013100	Project Management and Coordination
013200	Construction Progress Documentation
013300	Submittal Procedures
014200	References
015000	Temporary Facilities and Controls
015240	Construction Waste Management
017310	Cutting and Patching
017320	Selective Demolition
017700	Closeout Procedures
018000	List of Drawings

DIVISION 2 **EXISTING CONDITIONS**

022600A	Hazardous Material Assessment Summary
022600B	Hazardous Material Assessment
022600C	Asbestos Abatement Procedures

DIVISION 5 **METALS**

055000	Miscellaneous Metals
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DIVISION 7 **THERMAL AND MOISTURE PROTECTION**

075120	Roof Patching
076000	Flashing and Sheet Metal
079000	Caulking and Sealants

DIVISION 8 **OPENINGS**

081100	Hollow Metal Work
087100	Finish Hardware

DIVISION 9 FINISHES

092600	Gypsum Wallboard Systems
096610	Resilient Flooring Accessories
099113	Exterior Painting
099123	Interior Painting

DIVISION 14 CONVEYING EQUIPMENT

140000	Gearless Traction Elevators
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DIVISION 23 HEATING VENTILATING AND AIR CONDITIONING (not included this submittal)

230010	HVAC - General Provisions
230500	HVAC - Heating, Ventilation and Air Conditioning
230548	HVAC - Vibration Isolation and Seismic Restraint
230700	HVAC - Insulation

DIVISION 26 ELECTRICAL

260500	Electrical Basic Materials and Methods
260529	Hangers and Supports for Electrical Systems
260548	Vibration and Seismic Controls for Electrical Systems
264313	Surge Protection Device (SPD)
283100	Fire Alarm System

END OF SECTION 000010

**SE-310
REQUEST FOR ADVERTISEMENT**

2011 Edition
Rev. 7/20/2011

PROJECT NAME: COLUMBIA HALL ELEVATOR MODERNIZATION

PROJECT NUMBER: H27-6008

PROJECT LOCATION: University of South Carolina

Contractor may be subject to performance appraisal at close of project

BID SECURITY REQUIRED? Yes No

PERFORMANCE & PAYMENT BONDS REQUIRED? Yes No

CONSTRUCTION COST RANGE: \$750,000 - \$800,000

DESCRIPTION OF PROJECT: Modernizing the existing elevators. The existing geared traction elevator components will be replaced with gearless traction elevator components along with other related improvements as indicated within the contract documents. Small and minority business participation is encouraged. Bidders are responsible for obtaining all updates to bidding documents from the USC Purchasing website: <http://purchasing.sc.edu>. See Facilities /Construction Solicitation and Awards.

A/E NAME: Jumper Carter Sease Architects

A/E CONTACT: Mr. M. Keith Myhand, AIA

A/E ADDRESS: Street/PO Box:412 Meeting Street

City: West Columbia

State: South Carolina ZIP: 29169-

EMAIL: kmyhand@jcsarchitects.com

TELEPHONE: (803) 791-1020

FAX: (803) 791-1022

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

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

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

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

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

purchasing.sc.edu

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

DATE: 12/6/2012 **TIME:** 10:00 AM **PLACE:** 743 Greene Street, Columbia, SC 29208; Conference Room 53

The only site visit prior to bid will be conducted immediately following the pre-bid conference for prospective contractors, subcontractors, and suppliers. All parties are to meet outside of the south entrance of Columbia Residence Hall at 11:30 AM. NOTE: THIS WILL BE THE ONLY SITE VISIT PRIOR TO BIDDING AND IS HIGHLY RECOMMENDED.

AGENCY: University of South Carolina

NAME OF AGENCY PROCUREMENT OFFICER: Brookins, Juaquana

ADDRESS: Street/PO Box:743 Greene Street

City: Columbia

State: South Carolina ZIP: 29208-

EMAIL: JBROOKIN@fmc.sc.edu

TELEPHONE: (803) 777-5812

FAX: (803) 777-7334

BID CLOSING DATE: 12/19/2012 **TIME:** 1:30 PM **LOCATION:** 743 Greene Street, Columbia, SC 29208; Conference Room 53

BID DELIVERY ADDRESSES:

HAND-DELIVERY:

Attn: Brookins, Juaquana

University of South Carolina

743 Greene Street

Columbia, SC 29208

MAIL SERVICE:

Attn: Brookins, Juaquana

University of South Carolina

743 Greene Street

Columbia, SC 29208

SE-310
REQUEST FOR ADVERTISEMENT

2011 Edition
Rev. 7/20/2011

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

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

DATE: _____

AIA- A701 (1997)
Instructions To Bidders

Original AIA Document on file at the office of

Jumper Carter Sease Architects
412 Meeting Street
West Columbia, SC 29169
(803) 791-1020

OSE FORM 00201

STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

OWNER: University of South Carolina

PROJECT NUMBER: H27-6008

PROJECT NAME: Columbia Hall Elevator Modernization

PROJECT LOCATION: University of South Carolina

PROCUREMENT OFFICER: Brookins, Juaquana

1. STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

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

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

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

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

2. MODIFICATIONS TO A701-1997

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

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

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

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

2.4. *In Section 2.1.1:*

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

Insert the following at the end of this section:

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

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

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

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

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

2.2 CERTIFICATION OF INDEPENDENT PRICE DETERMINATION

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

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

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

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

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

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

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

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

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

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

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

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

2.3 DRUG FREE WORKPLACE

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

2.4 CERTIFICATION REGARDING DEBARMENT AND OTHER RESPONSIBILITY MATTERS

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

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

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

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

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

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

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

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

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

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

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

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

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

2.5 ETHICS CERTIFICATE

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

2.6 RESTRICTIONS APPLICABLE TO BIDDERS & GIFTS

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

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

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

2.7. Delete Section 3.1.1 and substitute the following:

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

2.8. Delete the language of Section 3.1.2 and insert the word "Reserved."**2.9. In Section 3.1.4, delete the words "and Architect may make" and substitute the words "has made."****2.10. Insert the following Section 3.1.5**

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

2.11. In Section 3.2.2:

Delete the words "and Sub-bidders"

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

2.12. In Section 3.2.3:

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

Insert the following at the end of the section:

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

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

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

2.14. Delete Section 3.3.2 and substitute the following:

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

2.15. Delete Section 3.4.3 and substitute the following:

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

OSE FORM 00201**STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS****2.16. Insert the following Sections 3.4.5 and 3.4.6:**

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

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

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

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

2.19. Delete Section 4.1.3 and substitute the following:

4.1.3 Sums shall be expressed in figures.

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

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

2.21. Delete Section 4.1.5 and substitute the following:

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

2.22. Delete Section 4.1.6 and substitute the following:

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

2.23. Delete Section 4.1.7 and substitute the following:

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

2.24. Delete Section 4.2.1 and substitute the following:

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

OSE FORM 00201**STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS****2.25. Delete Section 4.2.2 and substitute the following:**

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

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

2.26. Delete Section 4.2.3 and substitute the following:

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

2.27. Insert the following Section 4.2.4:

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

2.28. Delete Section 4.3.1 and substitute the following:

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

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

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

2.30. Delete Section 4.4.2 and substitute the following:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

6.1 CONTRACTOR'S RESPONSIBILITY

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

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

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

2.37. *Insert the following Section 6.4*

6.4 CLARIFICATION

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

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

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

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

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

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

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

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

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

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

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

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

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

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

9.2 CONTRACTOR LICENSING

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

9.3 SUBMITTING CONFIDENTIAL INFORMATION

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

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

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

9.4 POSTING OF INTENT TO AWARD

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

Room or Area of Posting: Lobby

Building Where Posted: Facilities Management Center

Address of Building: 743 Greene Street, Columbia, SC 29208

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

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

9.5 PROTEST OF SOLICITATION OR AWARD

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

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

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

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

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

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

9.6 SOLICITATION INFORMATION FROM SOURCES OTHER THAN OFFICIAL SOURCE

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

9.7 BUILDER'S RISK INSURANCE

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

OSE FORM 00201

STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

9.8 TAX CREDIT FOR SUBCONTRACTING WITH MINORITY FIRMS

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

§ 9.9 OTHER SPECIAL CONDITIONS OF THE WORK

1. See Article 3.104 and 3.105 of 00811-OSE Standard Supplemental Conditions Modifying Article 11.4 of AIA Document A201, 1997 Edition, requiring the contractor to provide the builder's risk insurance on the project.
2. Contractor shall comply with the attached "Certification Regarding Illegal Immigration (Nov. 2008).

END OF DOCUMENT

AIA- A310 (2010)
Bid Bond

Original AIA Document on file at the office of

Jumper Carter Sease Architects
412 Meeting Street
West Columbia, SC 29169
(803) 791-1020

**SE-330 – LUMP SUM BID
BID FORM**

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

BID SUBMITTED BY: _____
(Bidder's Name)

BID SUBMITTED TO: University of South Carolina
(Owner's Name)

FOR PROJECT: PROJECT NAME Columbia Hall Elevator Modernization
PROJECT NUMBER H27-6008

OFFER

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

§ 2. Pursuant to Section 11-32-3030(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:

ADDENDUM No: _____

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

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

§ 6.1 BASE BID WORK *(as indicated in the Bidding Documents and generally described as follows):* Modernizing the existing elevators. The existing geared traction elevator components will be replaced with gearless traction elevator components along with other related improvements as indicated within the contract documents. Small and minority business participation is encouraged.

_____, which sum is hereafter called the Base Bid.

(Bidder - insert Base Bid Amount on line above)

**SE-330 – LUMP SUM BID
BID FORM**

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

ALTERNATE # 1 (Brief Description): Refer to Specification Section 012300 "ALTERNATES and drawing Title Sheet T101

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): N/A

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): N/A

ADD TO or **DEDUCT FROM BASE BID:** _____

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

**SE-330 – LUMP SUM BID
 BID FORM**

2011 Edition
 Rev. 9/21/2011

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

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

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

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

INSTRUCTIONS FOR SUBCONTRACTOR LISTING

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

**SE-330 – LUMP SUM BID
BID FORM**

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

§ 9. TIME OF CONTRACT PERFORMANCE AND LIQUIDATED DAMAGES

a. **CONTRACT TIME:** Bidder agrees that the Date of Commencement of the Work shall be established in a Notice to Proceed to be issued by the Owner. Bidder agrees to substantially complete the Work within see 012000 calendar days from the Date of Commencement, subject to adjustments as provided in the Contract Documents.

b. **LIQUIDATED DAMAGES:** Bidder further agrees that from the compensation to be paid, the Owner shall retain as Liquidated Damages the sum of \$see 012000 for each calendar day the actual construction time required to achieve Substantial Completion exceeds the specified or adjusted time for Substantial Completion as provided in the Contract Documents. This sum is intended by the parties as the predetermined measure of compensation for actual damages, not as a penalty for nonperformance.

§ 10. AGREEMENTS

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

§ 11. ELECTRONIC BID BOND

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

Electronic Bid Bond Number: _____

Signature and Title: _____

**SE-330 – LUMP SUM BID
BID FORM**

BIDDER'S TAXPAYER IDENTIFICATION

FEDERAL EMPLOYER'S IDENTIFICATION NUMBER: _____

OR

SOCIAL SECURITY NUMBER: _____

CONTRACTOR'S CLASSIFICATIONS AND SUBCLASSIFICATIONS WITH LIMITATIONS

Classification(s) & Limits: _____

Subclassification(s) & Limits: _____

SC Contractor's License Number(s): _____

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

SIGNATURE

BIDDER'S LEGAL NAME: _____

ADDRESS: _____

BY: _____
(Signature)

DATE: _____

TITLE: _____

TELEPHONE: _____

EMAIL: _____

AIA- A101 (2007)
Standard Form of Agreement Between
Owner and Contractor

Original AIA Document on file at the office of

Jumper Carter Sease Architects
412 Meeting Street
West Columbia, SC 29169
(803) 791-1020

OSE FORM 00501 STANDARD MODIFICATIONS TO AGREEMENT BETWEEN OWNER AND CONTRACTOR

OWNER: University of South Carolina

PROJECT NUMBER: H27-6008

PROJECT NAME: Columbia Hall Elevator Modernization

1. STANDARD MODIFICATIONS TO AIA A101-2007

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

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

2. MODIFICATIONS TO A101

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

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

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

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

2.3. *Delete Section 3.2 and substitute the following:*

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

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

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

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

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

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

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

OSE FORM 00501
STANDARD MODIFICATIONS TO AGREEMENT BETWEEN
OWNER AND CONTRACTOR

2.7. In Section 5.1.8, delete the word “follows” and the colon and substitute the following:

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

2.8. In Section 5.1.9, delete the words “Except with the Owner’s prior approval, the” before the word “Contractor.”

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

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

2.11. Delete the language of Section 8.2 and substitute the word “Reserved.”

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

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

Name: Tom Opal
Title: Sr. Project Manager
Address: 743 Greene Street, Columbia, SC 29208
Telephone: (803) 777-7076 **FAX:** (803) 777-8739
Email: tnopal@fmc.sc.edu

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

Name: Pete Fisher
Title: Project Manager
Address: 743 Greene Street, Columbia, SC 29208
Telephone: (803) 777-9346 **FAX:** (803) 777-8739
Email: pfisher@fmc.sc.edu

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

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

Name: _____
Title: _____
Address: _____
Telephone: _____ **FAX:** _____
Email: _____

OSE FORM 00501
STANDARD MODIFICATIONS TO AGREEMENT BETWEEN
OWNER AND CONTRACTOR

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

Name: _____
Title: _____
Address: _____
Telephone: _____ FAX: _____
Email: _____

2.14. *Add the following Section 8.6.1:*

8.6.1 The Architect's representative:

Name: M. Keith Myhand, AIA, CSI
Title: Architect
Address: 412 Meeting Street, West Columbia, SC 29169
Telephone: (803) 791-1020 FAX: (803) 791-1022
Email: kmyhand@jcsarchitects.com

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

Invitation for Construction Bids (SE-310)
Instructions to Bidders (AIA Document A701-1997)
Standard Supplemental Instructions to Bidders (OSE Form 00201)
Contractor's Bid (Completed SE-330)
Notice of Intent to Award (Completed SE-370)
Certificate of procurement authority issued by the SC Budget & Control Board

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

END OF DOCUMENT

AIA- A201 (2007)
General Conditions of the Contract
for Construction

Original AIA Document on file at the office of

Jumper Carter Sease Architects
412 Meeting Street
West Columbia, SC 29169
(803) 791-1020

OSE FORM 00811
STANDARD SUPPLEMENTARY CONDITIONS

OWNER: University of South Carolina
PROJECT NUMBER: H27-6008
PROJECT NAME: Columbia Hall Elevator Modernization

1 GENERAL CONDITIONS

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

2 STANDARD SUPPLEMENTARY CONDITIONS

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

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

3 MODIFICATIONS TO A201-2007

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

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

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

3.3 *Add the following Section 1.1.9:*

1.1.9 NOTICE TO PROCEED

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

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

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

3.5 *Delete Section 1.5.1 and substitute the following:*

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

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3.6 *Delete Section 2.1.1 and substitute the following:*

2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner’s approval or authorization, except as provided in Section 7.1.2. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term “Owner” means the Owner or the Owner’s Representative. [Reference § 8.2 of the Agreement.]

3.7 *Delete Section 2.1.2 and substitute the following:*

2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to post Notice of Project Commencement pursuant to Title 29, Chapter 5, Section 23 of the South Carolina Code of Laws, as amended.

3.8 *Delete Section 2.2.3 and substitute the following:*

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

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

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

3.10 *Delete Section 2.2.5 and substitute the following:*

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

3.11 *Add the following Sections 2.2.6 and 2.2.7:*

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

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

3.12 *Delete Section 2.4 and substitute the following:*

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

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

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

3.14 *In the third sentence of Section 3.2.4, insert the word “latent” before the word “errors.”*

3.15 *In the last sentence of Section 3.3.1, insert the words “by the Owner in writing” after the word “instructed.”*

3.16 *Delete the third sentence of Section 3.5 and substitute the following sentences:*

Work, materials, or equipment not conforming to these requirements shall be considered defective. Unless caused by the Contractor or a subcontractor at any tier, the Contractor’s warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage.

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

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

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

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

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

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

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

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

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

acceptable to the Owner,

3.22 *Delete Section 3.9.2 and substitute the following:*

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

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

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

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

3.24 *Delete Section 3.10.3 and substitute the following:*

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

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

3.25 *Add the following Section 3.10.4:*

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

3.26 *Add the following Section 3.12.5.1:*

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

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

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

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

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3.29 Add the following Sections 3.13.2 and 3.13.3:

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

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

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

including loss of use resulting therefrom,

3.31 *Delete Section 4.1.1 and substitute the following:*

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

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

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

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

The Architect will visit the site as necessary to fulfill its obligation to the Owner for inspection services, if any, and, at a minimum, to assure conformance with the Architect’s design as shown in the Contract Documents and to observe the progress and quality of the various components of the Contractor’s Work, and to determine if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents.

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

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

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

Work completed and correlated with the

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

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

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

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

3.38 *Delete Section 4.2.14 and substitute the following:*

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

3.39 *Delete Section 5.2.1 and substitute the following:*

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

3.40 *Delete Section 5.2.2 and substitute the following:*

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

3.41 *In the first sentence of Section 5.2.3, delete the words “...or Architect...” in the two places they appear.*

3.42 *Delete the words “...or Architect...” in the in the first sentence of Section 5.2.4 and insert the following sentence at the end of Section 5.2.4:*

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

3.43 *Add the following Section 5.2.5:*

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

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

5.3.1 By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor’s Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not

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prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise herein or in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

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

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

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

3.45 *Delete the last sentence of Section 5.4.1.*

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

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

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

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

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

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

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

3.49 *Delete Section 7.2.1 and substitute the following:*

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

- .1 The change in the Work;

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

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

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

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

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

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

3.51 *Delete 7.3.3 and substitute the following:*

7.3.3 PRICE ADJUSTMENTS

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

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

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

3.52 *Delete Section 7.3.7 and substitute the following:*

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

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

3.53 *Delete Section 7.3.8 and substitute the following:*

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

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

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

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

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

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

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

§ 7.6.3 Records Retention.

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

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3.55 Delete Section 8.2.2 and substitute the following:

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

3.56 Delete Section 8.3.1 and substitute the following:

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

3.57 Insert the following at the end of Section 9.1:

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

3.58 Delete Section 9.2 and substitute the following:

9.2 SCHEDULE OF VALUES

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

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

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

3.59 Delete Section 9.3.1 and substitute the following:

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

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

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

Insert the following at the end of Section 9.3.2:

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

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

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

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

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

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

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

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

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

3.64 *Delete Section 9.7 and substitute following:*

9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment to the Owner, through no fault of the Contractor, within seven days after receipt of the Contractor’s Application for Payment, or if the Owner does not pay the Contractor within seven days after the time established in the Contract Documents the amount certified by the Architect or awarded by a final dispute resolution order, then the Contractor may, upon seven additional days’ written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased, in accordance with the provisions of Section 7.3.3, by the amount of the Contractor’s reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

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

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

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

3.67 *Delete Section 9.8.3 and substitute the following:*

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

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demonstration by the Contractor that all equipment, systems and operable components of the Work function properly and in accordance with the Contract Documents. If the Architect’s inspection discloses any item, whether or not included on the Contractor’s list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion. If more than one Substantial Completion inspection is required, the Contractor shall reimburse the Owner for all costs of reinspections or, at the Owner’s option, the costs may be deducted from payments due to the Contractor.

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

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

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

3.70 *Delete Section 9.10.1 and substitute the following:*

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

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

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

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

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

3.73 Delete Section 9.10.5 and substitute the following:

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

3.74 Add the following Section 9.10.6:

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

3.75 Delete Section 10.3.1 and substitute the following:

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

3.76 Insert the following at the end of Section 10.3.2:

In the absence of agreement, the Architect will make an interim determination regarding any delay or impact on the Contractor's additional costs. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15. Any adjustment in the Contract Sum shall be determined in accordance with Section 7.3.3.

3.77 Delete Section 10.3.3 and substitute the following:

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

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

In addition to its obligations under Section 3.18, the

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

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3.80 *Insert the following at the end of Section 10.4:*

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

3.81 *Delete 11.1.2 and substitute the following:*

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

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

- (2) BUSINESS AUTO LIABILITY (including All Owned, Non-owned, and Hired Vehicles):
 - (a) Combined Single Limit \$1,000,000

- (3) WORKER’S COMPENSATION:
 - (a) State Statutory
 - (b) 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 Section 11.1.2. The umbrella policy limits shall not be less than \$3,000,000.

3.82 *Delete Section 11.1.3 and substitute the following:*

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

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

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

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

3.83 *Delete Section 11.1.4 and substitute the following:*

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

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

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

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

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

3.87 *Delete Section 11.3.2 and substitute the following:*

11.3.2 BOILER AND MACHINERY INSURANCE

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

3.88 *Delete Section 11.3.3 and substitute the following:*

11.3.3 LOSS OF USE INSURANCE

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

3.89 *Delete Section 11.3.4 and substitute the following:*

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

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

3.91 *Delete Section 11.3.6 and substitute the following:*

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

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

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

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

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

3.94 Delete Section 11.3.9 and substitute the following:

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

3.95 Delete Section 11.3.10 and substitute the following:

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

3.96 Delete Section 11.4.1 and substitute the following:

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

3.97 Delete Section 11.4.2 and substitute the following:

11.4.2 The Performance and Labor and Material Payment Bonds shall:

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

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3.98 *Add the following Sections 11.4.3 and 11.4.4:*

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

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

3.99 *Delete Section 12.1.1 and substitute the following:*

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

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

3.101 *In Section 12.2.2.3, add the following to the end of the sentence:*

unless otherwise provided in the Contract Documents.

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

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

3.103 *Delete Section 13.1 and substitute the following:*

13.1 GOVERNING LAW

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

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

13.2 SUCCESSORS AND ASSIGNS

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

3.105 *Delete Section 13.3 and substitute the following:*

13.3 WRITTEN NOTICE

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

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

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

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

Unless expressly provided otherwise,

3.107 *Add the following Section 13.4.3:*

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

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

3.5 Warranty

3.17 Royalties, Patents and Copyrights

3.18 Indemnification

7.6 Cost or Pricing Data

11.1 Contractor's Liability Insurance

11.4 Performance and Payment Bond

15.1.6 Claims for Listed Damages

15.1.7 Waiver of Claims Against the Architect

15.6 Dispute Resolution

15.4 Service of Process

3.108 *Delete Section 13.6 and substitute the following:*

13.6 INTEREST

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

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

3.110 *Add the following Sections 13.8 through 13.16:*

13.8 PROCUREMENT OF MATERIALS BY OWNER

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

13.9 INTERPRETATION OF BUILDING CODES

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

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13.10 MINORITY BUSINESS ENTERPRISES

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

13.11 SEVERABILITY

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

13.12 ILLEGAL IMMIGRATION

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

13.13 SETOFF

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

13.14 DRUG-FREE WORKPLACE

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

13.15 FALSE CLAIMS

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

13.16 NON-INDEMNIFICATION:

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

3.111 *Delete Section 14.1.1 and substitute the following:*

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

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

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- .2 An act of government, such as a declaration of national emergency that requires substantially all Work to be stopped.
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents and the Contractor has stopped work in accordance with Section 9.7

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

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

3.113 *In Section 14.1.4, replace the word “repeatedly” with the word “persistently.”***3.114** *Delete Section 14.2.1 and substitute the following:***14.2.1** The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials, or otherwise fails to prosecute the Work, or any separable part of the Work, with the diligence, resources and skill that will ensure its completion within the time specified in the Contract Documents, including any authorized adjustments;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the Contract Documents and the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

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

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

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

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

3.119 *Delete Section 14.4.1 and substitute the following:*

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

3.120 *Delete Section 14.4.2 and substitute the following:*

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

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

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- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders; and
- .4 complete the performance of the Work not terminated, if any.

3.121 *Delete Section 14.4.3 and substitute the following:*

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

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

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

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

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

14.5 CANCELLATION AFTER AWARD BUT PRIOR TO PERFORMANCE

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

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

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

3.124 *Delete Section 15.1.2 and substitute the following:*

15.1.2 NOTICE OF CLAIMS

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

3.125 *Delete Section 15.1.3 and substitute the following:*

15.1.3 CONTINUING CONTRACT PERFORMANCE

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

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

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

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

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

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

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

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

15.1.6.2 For the Contractor, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) attorney's fees, (vi) any interest, except to the extent allowed by Section 13.6 (Interest); (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waived as against the Owner. Without limitation, this mutual waiver is applicable to all damages due to either party's termination in accordance with Article 14. Nothing contained in this Section shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

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

Notwithstanding any other provision of the Contract Documents, including Section 1.2.1, but subject to a duty of good faith and fair dealing, the Contractor waives all claims against the Architect and any other design professionals who provide design and/or project management services to the Owner, either directly or as independent contractors or subcontractors to the Architect, for listed damages arising out of or relating to this Contract. The listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v)

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attorney's fees, (vi) any interest; (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waived as against the Owner. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

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

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

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

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

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

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

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

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

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

15.6 DISPUTE RESOLUTION

15.6.1 If a claim is not resolved pursuant to Section 15.5 to the satisfaction of either party, both parties shall attempt to resolve the dispute at the field level through discussions between Contractor's Representative and Owner's Representative. If a dispute cannot be resolved through Contractor's Representative and Owner's Representative, then the Contractor's Senior Representative and the Owner's Senior Representative, upon the request of either party, shall meet as soon as conveniently possible, but in no case later than twenty-one days after such a request is made, to attempt to resolve such dispute. Prior to any meetings between the Senior Representatives, the parties will exchange relevant information that will assist the parties in resolving their dispute. The meetings required by this Section are a condition precedent to resolution pursuant to Section 15.6.2.

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

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

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

15.6.5 SERVICE OF PROCESS

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

3.132 Add the following Article 16:

ARTICLE 16 PROJECT-SPECIFIC REQUIREMENTS AND INFORMATION

16.1. Inspection Requirements: *(Indicate the inspection services required by the Contract)*

- Special Inspections are required and are not part of the Contract Sum. *(see section 01400)*
- Building Inspections are required and are not part of the Contract Sum. *(see section 01400)*
- Building Inspections are required and are part of the Contract Sum. The inspections required for this Work are : *(Indicate which services are required and the provider)*

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

Remarks: _____

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

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

NONE

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

NONE

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

Specification Section 13300 "Submittal procedures" and as indicated in other individual specificatin sections.

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

Specification Section 15000 "Temporary Facilities"

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

NONE

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

NONE

USC SUPPLEMENTAL GENERAL CONDITIONS
FOR CONSTRUCTION PROJECTS

1. Contractor's employees shall take all reasonable means not to interrupt the flow of student traffic in building corridors, lobbies and stairs. All necessary and reasonable safety precautions shall be taken to prevent injury to building occupants while transporting materials and equipment through the building to the work area. Providing safe, accessible, plywood pedestrian ways around construction may be required if a suitable alternative route is not available.
2. Fraternalization between Contractor's employees and USC students, faculty or staff is strictly prohibited-zero tolerance!
3. USC will not tolerate rude, abusive or degrading behavior on the job site. Heckling and cat-calling directed toward students, faculty or staff or any other person on USC property is strictly prohibited. Any contractor whose employees violate this requirement will be assessed a fine of up to \$500 per violation.
4. Contractor's employees must adhere to the University's policy of maintaining a drug-free and smoke-free/tobacco free workplace.
5. Contractor must sign a Contractor Key Receipt/Return form before any keys are issued. Keys must be returned immediately upon the completion of the work. The Contractor will bear the cost of any re-keying necessary due to the loss of or failure to return keys.
6. A welding permit must be issued by the University Fire Marshall before any welding can begin inside a building. Project Manager will coordinate.
7. Contractor must notify the University immediately upon the discovery of suspect material such as those potentially containing asbestos or other such hazardous materials. These materials **must not** be disturbed until approved by the USC Project Manager.
8. At the beginning of the project, the USC Project Manager will establish the Contractor's lay-down area. This area will also be used for the Contractor's work vehicles. No personal vehicles will be allowed in this area, or in any areas surrounding the construction site that are not regular or authorized parking lots. Personal vehicles must be parked in the perimeter parking lots. Parking permits can be obtained at the USC Parking Office located in the Pendleton Street parking garage. The lay down area will be clearly identified to the contractor by the PM, with a sketch or drawing provided to Parking. In turn, the contractor will mark off this area with a sign containing the project name, PM name, Contractor name and contact number, and end date. Where this area is subject to foot traffic, protective barriers will be provided as specified by the PM. The area will be maintained in a neat and orderly fashion. Vehicles parked in the lay down area (or designated parking areas) will be clearly marked or display a CPC furnished placard for identification.

9. Contractor will be responsible for providing its own temporary toilet facilities, unless prior arrangements are made with the USC Project Manager.
10. Use of USC communications facilities (telephones, computers, etc.) by the Contractor is prohibited, unless prior arrangements are made with the USC Project Manager.
11. For all projects over \$100,000, including IDC 's, an SE-395, Contractor Performance Evaluation, will be completed by the USC Project Manager and reviewed with the GC at the beginning of the project and a copy given to the GC. At the end of the project the form will be completed and a Construction Performance rating will be established.
12. Contractor is responsible for removal of all debris from the site, and is required to provide the necessary dumpsters which will be emptied at least _____ times per week. Construction waste must not be placed in University dumpsters. THE CONSTRUCTION SITE MUST BE THOROUGHLY CLEANED WITH ALL TRASH PICKED UP AND PROPERLY DISPOSED OF ON A DAILY BASIS AND THE SITE MUST BE LEFT IN A SAFE AND SANITARY CONDITION EACH DAY. THE UNIVERSITY WILL INSPECT JOB SITES REGULARLY AND WILL FINE ANY CONTRACTOR FOUND TO BE IN VIOLATION OF THIS REQUIREMENT AN AMOUNT OF UP TO \$1,000 PER VIOLATION.
13. **Contractor must provide all O&M manuals, as-built drawings, and training of USC personnel on new equipment, controls, etc. prior to Substantial Completion. Final payment will not be made until this is completed.**
14. The contractor will comply with all regulations set forth by OSHA and SCDHEC. Contractor must also adhere to USC's internal policies and procedures (available by request). As requested, the contractor will submit all Safety Programs and Certificates of Insurance to the University for review.
15. Tree protection fencing is required to protect existing trees and other landscape features to be preserved within a construction area. The limits of this fence will be evaluated for each situation with the consultant, USC Arborist and USC Project Manager. The tree protection fence shall be 5' high chain link fence unless otherwise approved by USC Project Manager. No entry or materials storage will be allowed inside the tree protection zone. A 4" layer of mulch shall be placed over the tree protection area to maintain moisture in the root zone.
16. Where it is necessary to cross walks, tree root zones (i.e., under canopy) or lawns the following measures shall be taken: For single loads up to 9,000 lbs., a 3/4" minimum plywood base shall be placed over areas impacted. For single loads over 9,000 lbs., two layers of 3/4" plywood is required.
17. For projects requiring heavy loads to cross walks tree root zones or lawns. A construction entry road consisting of 10' X 16' oak logging mates on 12" coarse, chipped, hardwood base. Mulch and logging mats shall be supplemented throughout the project to keep

Updated: July 15, 2011

matting structurally functional.

18. Any damage to existing landscaping (including lawn areas) will be remediated before final payment is made.
19. Orange safety fence to be provided by the contractor. (USC Arborist, Kevin Curtis may be contacted at 777-0033 or 315-0319)

Campus Vehicle Expectations

1. All motorized vehicles on the University campus are expected to travel and park on roadways and/or in parking stalls.
2. All motorized vehicle traffic on USC walkways must first receive the Landscape Manager=s authorization. Violators may be subject to fines and penalties.
3. All motorized vehicles that leak or drip liquids are prohibited from traveling or parking on walks or landscaped areas.
4. Contractors, vendors, and delivery personnel are required to obtain prior parking authorization before parking in a designated space. Violators may be subject to fines and/or penalties. See Item 10 below.
5. Drivers of equipment or motor vehicles that damage university hardscape or landscape will be held personally responsible for damages and restoration expense.
6. Vehicle drivers who park on landscape or drives must be able to produce written evidence of need or emergency requiring parking on same.
7. All vehicles parked on landscape, hardscape, or in the process of service delivery, must display adequate safety devices, i.e. flashing lights, cones, signage, etc.
8. All drivers of equipment and vehicles will be respectful of University landscape, equipment, structures, fixtures and signage.
9. All incidents of property damage will be reported to Parking Services or the Work Management Center.
10. Parking on campus is restricted to spaces designated by Parking Services at the beginning of the project. Once the project manager and contractor agree on how many spaces are needed, the project manager will obtain a placard for each vehicle. This placard must be hung from the mirror of the vehicle, otherwise a ticket will be issued and these tickets cannot be “fixed”. Parking spaces are restricted to work vehicles only; no personal vehicles.

Performance Bond

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

Name: _____
Address: _____

hereinafter referred to as “Contractor”, and *(Insert full name and address of principal place of business of Surety)*

Name: _____
Address: _____

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

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

hereinafter referred to as “Agency”, or its successors or assigns, the sum of _____ (\$ _____), being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ entered into a contract with Agency to construct

State Project Name: Columbia Hall Elevator Modernization
State Project Number: H27-6008
Brief Description of Awarded Work, as found on the SE-330, Bid Form: Modernizing the existing elevators. The existing geared traction elevator components will be replaced with gearless traction elevator components along with other related improvements as indicated within the contract documents. Small and minority business participation is encouraged.

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

Name: Jumper Carter Sease Architects
Address: 412 Meeting Street
West Columbia, SC 29169

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

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

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

CONTRACTOR

SURETY

By: _____
(Seal)

By: _____
(Seal)

Print Name: _____

Print Name: _____

Print Title: _____

Print Title: _____
(Attach Power of Attorney)

Witness: _____

Witness: _____

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

Performance Bond

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7.4 Liquidated Damages, or if no Liquidated Damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. The Surety shall not be liable to the Agency or others for obligations of the Contractor that are unrelated to the Contract, and the Balance of the Contract Sum shall not be reduced or set-off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Agency or its heirs, executors, administrators, or successors.

9. The Surety hereby waives notice of any change, including changes of time, to the contract or to related subcontracts, purchase orders and other obligations.

10. Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the address shown on the signature page.

11. Definitions

11.1 Balance of the Contract Sum: The total amount payable by the Agency to the Contractor under the Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts to be received by the Agency in settlement of insurance or other Claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Contract.

11.2 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform the Contract or otherwise to comply with the terms of the Contract.

**SE-357
Labor and Material Payment Bond**

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

Name: _____
Address: _____

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

Name: _____
Address: _____

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

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

hereinafter referred to as "Agency", or its successors or assigns, the sum of _____ (\$ _____), being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ entered into a contract with Agency to construct

Project Name: Columbia Hall Elevator Modernization
Project Number: H27-6008
Brief Description of Awarded Work, as found on the SE-330, Bid Form: Modernizing the existing elevators. The existing geared traction elevator components will be replaced with gearless traction elevator components along with other related improvements as indicated within the contract documents. Small and minority business participation is encouraged.

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

Name: Jumper Carter Sease Architects
Address: 412 Meeting Street
West Columbia, SC 29169

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

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

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

CONTRACTOR

SURETY

By: _____
(Seal)

By: _____
(Seal)

Print Name: _____

Print Name: _____

Print Title: _____

Print Title: _____
(Attach Power of Attorney)

Witness: _____

Witness: _____

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

SE-357**Labor and Material Payment Bond****NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:**

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Agency to pay for all labor, materials and equipment required for use in the performance of the Contract, which is incorporated herein by reference.
2. With respect to the Agency, this obligation shall be null and void if the Contractor:
 - 2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants; and
 - 2.2 Defends, indemnifies and holds harmless the Agency from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract.
3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.
4. With respect to Claimants, and subject to the provisions of Title 29, Chapter 5 and the provisions of §11-35-3030(2)(c) of the SC Code of Laws, as amended, the Surety's obligation under this Bond shall arise as follows:
 - 4.1 Every person who has furnished labor, material or rental equipment to the Contractor or its subcontractors for the work specified in the Contract, and who has not been paid in full therefore before the expiration of a period of ninety (90) days after the date on which the last of the labor was done or performed by him or material or rental equipment was furnished or supplied by him for which such claim is made, shall have the right to sue on the payment bond for the amount, or the balance thereof, unpaid at the time of institution of such suit and to prosecute such action for the sum or sums justly due him.
 - 4.2 A remote claimant shall have a right of action on the payment bond upon giving written notice by certified or registered mail to the Contractor within ninety (90) days from the date on which such person did or performed the last of the labor or furnished or supplied the last of the material or rental equipment upon which such claim is made.
 - 4.3 Every suit instituted upon a payment bond shall be brought in a court of competent jurisdiction for the county or circuit in which the construction contract was to be performed, but no such suit shall be commenced after the expiration of one year after the day on which the last of the labor was performed or material or rental equipment was supplied by the person bringing suit.
5. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:
 - 5.1 Send an answer to the Claimant, with a copy to the Agency, within sixty (60) days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
 - 5.2 Pay or arrange for payment of any undisputed amounts.
 - 5.3 The Surety's failure to discharge its obligations under this paragraph 5 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a claim. However, if the Surety fails to discharge its obligations under this paragraph 5, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs to recover any sums found to be due and owing to the Claimant.
6. Amounts owed by the Agency to the Contractor under the

Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the Contractor furnishing and the Agency accepting this Bond, they agree that all funds earned by the contractor in the performance of the Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Agency's prior right to use the funds for the completion of the Work.

7. The Surety shall not be liable to the Agency, Claimants or others for obligations of the Contractor that are unrelated to the Contract. The Agency shall not be liable for payment of any costs or expenses of any claimant under this bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

8. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

9. Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the Agency or the contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

10. By the Contractor furnishing and the Agency accepting this Bond, they agree that this Bond has been furnished to comply with the statutory requirements of the South Carolina Code of Laws, as amended, and further, that any provision in this Bond conflicting with said statutory requirements shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

11. Upon request of any person or entity appearing to be a potential beneficiary of this bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

12. Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the laws of the State of South Carolina.

13. DEFINITIONS

13.1 Claimant: An individual or entity having a direct contract with the Contractor or with a Subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of the Contractor and the Contractor's Subcontractors, and all other items for which a mechanic's lien might otherwise be asserted.

13.2 Remote Claimant: A person having a direct contractual relationship with a subcontractor of the Contractor or subcontractor, but no contractual relationship expressed or implied with the Contractor.

13.3 Contract: The agreement between the Agency and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

Project Name: USC COLUMBIA HALL ELEVATOR MODERNIZATION
Project Number: H27-6008
University of South Carolina

CONTRACTOR'S ONE YEAR GUARANTEE

STATE OF _____

COUNTY OF _____

We _____ as General Contractor on the above named project do hereby guarantee that all work executed under the requirements of the Contract Documents shall be free from defects due to faulty materials and/or workmanship for the period of one (1) year from the date of acceptance of the work by the Owner and/or Architect/Engineer, and hereby agree to remedy defects due to faulty materials and/or workmanship, and pay for any damage resulting therefrom, at no cost to the Owner, provided however, that the following are excluded from this guarantee:

Defects or failures resulting from abuse by the Owner; damage caused by fire, tornado, hail, hurricane, acts of God, wars, riots, or civil commotion.

(Name of Contracting Firm)

*By

Title

** Must be executed by an officer of the Contracting Firm.

SWORN TO before me this
_____ day of _____ 20 _____ (SEAL)
_____ (STATE)

My commission expires _____

ONE YEAR GUARANTEE FORM

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
1. Work covered by the Contract Documents.
 2. Use of premises.
 3. Owner's occupancy requirements.
 4. Specification formats and conventions.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: **COLUMBIA HALL ELEVATOR MODERNIZATION**
- B. Project Location: **COLUMBIA, SOUTH CAROLINA**
- C. Owner: **UNIVERSITY OF SOUTH CAROLINA**
1. Owner's Representative: **PETE FISHER, PROJECT MANAGER, FACILITIES PLANNING AND CONSTRUCTION, UNIVERSITY OF SOUTH CAROLINA**
- D. The Work consists of **COLUMBIA HALL ELEVATOR MODERNIZATION** per the contract documents.
- E. The project will be constructed under a single prime contract.

1.3 WORK UNDER OTHER CONTRACTS

- A. Concurrent Work: Owner may elect to award separate contract(s) for other construction operations at Project site. Those operations may be conducted simultaneously with work under this Contract.

1.4 USE OF PREMISES

- A. Use of Site: Limit use of premises to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
1. Owner Occupancy: Allow for Owner occupancy of Project site.
 2. Driveways and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

1.5 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 33-division format and CSI/CSC's "MasterFormat" 2004 Version numbering system.
1. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

1.0 GENERAL

1.1 SCOPE: This section lists known special conditions that exist or pertain to the Contract Documents.

1.2 SPECIAL CONDITIONS:

- A. ASBESTOS: It is the intent of the plans and specifications to specify only non-asbestos containing materials.** Asbestos is defined as follows:
ASBESTOS - The asbestiform varieties of serpentine (chrysotile), rie bekite (crocidolite), cummingtonite grunerite (amosite), anthrophyllite, actinolite, and tremolite.
Materials containing any form of asbestos in any percentages shall not be used. PRODUCTS SHALL BE ASBESTOS FREE. Suppliers supplying materials containing asbestos in any form or percentages shall be responsible for the removal of these materials if delivered or installed and any cleanup required, in addition to the installation of asbestos free materials.
- B. EXISTING ASBESTOS: It is known that the materials of the existing construction contain asbestos as indicated is sections 022600A "Hazardous Materials Summary", 022600B "Hazardous Materials Assessment, and 022600C "Asbestos Abatement Procedures" of these specifications. Refer to these sections for additional information.**

Abatement of the asbestos containing materials will be provided by the owner. The General Contractor of this project is to consult with the owner in advance and include all abatement related efforts within the General Contractor's project schedule.

The owner's abatement contractor will remove areas of the existing drywall & joint compound along with any existing equipment, conduit, etc..., located on the existing positive drywall surfaces as required for the work of this project. Replacement of the drywall will be by the General Contractor. All drywall finishing will be by wet sand method only.

The General Contractor is responsible for coordinating all abatement related efforts with the owner as the General Contractor is fully responsible for the project schedule and ensuring that ALL work is 100% complete by July 29, 2013.

- C. HEAVY METALS:** It is the intent of these plans and specifications to specify materials containing NO HEAVY METALS BY DESIGN. Heavy metals are defined as mercury, lead and other metals known to cause bodily harm. Lead products may be used in roofing applications. Lead soldering for any water or waste water is not allowed. Products containing heavy metals may be used only with the written permission of the architect. Cleanup for products, containing heavy metals, installed without written permission shall be at the contractors expense. Installation of new non-heavy metal products shall be at no cost to the owner.
- D. The Contractor, His Subcontractors and/or Personnel Employed by either shall:**
1. Remain in the designated work areas.
 2. Maintain a safe work site at all times.
 3. Schedule all work with the Owner.
 4. Remain fully clothed at all times on or around job site.
 5. Have no verbal contact with students or staff.
 6. Sunday work will be allowed.

7. In accordance with State Law, this facility is a No Smoking Facility. An exterior smoking area will be established by the Owner and any smoking shall occur at that area.
8. During rainy weather the general contractor shall maintain adequate forces on the job to keep water out of spaces at tie-ins and other similar areas where construction activities have compromised existing walls and roof systems. Also provide "dams", diversions, etc. as required to keep occupied spaces dry.

3.0 NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 TIME FOR COMPLETION

Time for Completion: Attention is directed to the fact that the building and facilities are urgently needed by the Owner and that time is of the essence; for this reason, it shall be agreed that the Contractor shall begin work and complete work as listed in the following scheduled:

Building Area	Ordering of Materials	Start Date	Completion Date
All areas as shown on plans and noted in specifications	Upon Notice to Proceed & completion of required submittals as specified.	May 13, 2013 (Start of onsite work)	July 29, 2013 (Substantially Complete July 15, 2013)

1.2 INCLEMENT WEATHER

No Time Extensions will be granted for inclement weather.

1.3 LIQUIDATED DAMAGES

Should the Contractor fail to complete the work 100% under this Contract before 12:00 AM (midnight) on July 29, 2013, the Owner shall be compensated, as liquidated damages, the sum of Two Thousand Five Hundred Dollars (\$2,500.00) for each succeeding calendar day, Saturdays, Sundays, & holidays included that the terms of the Contract remain unfulfilled, which sum is agreed upon as the proper measure of liquidated damages which Owner will sustain per diem by failure of Contractor to complete the work by the time stipulated and this sum is not to be construed as in any sense a penalty.

1.4 SUBSTANTIAL COMPLETION:

- A. A minimum of 14 days prior to completing the project, the contractor shall inspect the entire project with his subcontractors. A list of incorrect/incomplete items will be forwarded to the Architect. The Contractor shall immediately start correcting this list and date the items as they are completed. THE ARCHITECT NOR THE ENGINEERS WILL START THEIR PUNCH LIST PRIOR TO RECEIVING THE CONTRACTOR'S COMPLETED LIST.
- B. The final inspection shall be made by the Architect and his consultants after the contractors list with dated corrections is received by the Architect. A list of these incorrect/incomplete items will be forwarded to the contractor.
- C. Contractor shall correct all items on any and all punch lists, and at that time shall certify in writing that all items are correct and complete. Monies will be withheld from the contract until all Punch List items are acceptable by the Architect. The architect, alone, will determine amounts to be withheld. A minimum of 2-½% of the total project cost will be held until the punch list is 100% complete. \$2500.00 per day for liquidated damages will be reinstated if punch list items are not completed by 12:00 AM (midnight) on July 29, 2013. At substantial completion, the facility will be occupied.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.
 - 3. The Alternates are not in precise order of acceptance and may be accepted, rejected, or deferred in any order.

1.3 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been Accepted, Rejected, or Deferred for later consideration. Include a complete description of negotiated modifications to alternates, if any.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Alternate prices may be held 90-days beyond contract acceptance. Alternate prices listed below shall be good for ninety (90) days beyond the date of contract acceptance. The Owner may accept or reject any or all alternates within the above stated time frame.
- E. Schedule: A schedule of alternates is included at the end of this Section. The related Specification Sections contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES:

A. **ADD ALTERNATE No. 1**

State the Lump Sum amount to be added to the Base Bid for all work associated with replacing the existing panel PH-DP feeder conductors if deemed necessary by the owner as indicated on the electrical drawings.

END OF SECTION 012300

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing contract modifications. These projects will utilize the AIA Documents listed.

1.2 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- C. Proposal Request Form: Use AIA Document G709 for Proposal Requests.
- 1.4 CHANGE ORDER PROCEDURES
- A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on form SE-480 Construction Change Order (2011).
- 1.5 CONSTRUCTION CHANGE DIRECTIVE
- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012400

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Section:
 - 1. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1.3 SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use facsimile of form provided in the Project Manual.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided

- within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
- k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Addendum, Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Requested substitution will not adversely affect Contractor's construction schedule.
 - c. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - d. Requested substitution is compatible with other portions of the Work.
 - e. Requested substitution has been coordinated with other portions of the Work.
 - f. Requested substitution provides specified warranty.
 - g. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

- B. Substitutions for Convenience: Not allowed, unless otherwise indicated or approved prior to the bid opening.
- C. Substitutions for Convenience: Architect will consider requests for substitution if received within 30 days after the Notice of Award.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Requested substitution will not adversely affect Contractor's construction schedule.
 - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - f. Requested substitution is compatible with other portions of the Work.
 - g. Requested substitution has been coordinated with other portions of the Work.
 - h. Requested substitution provides specified warranty.
 - i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SUBSTITUTION REQUEST FORM

TO: _____

PROJECT: _____

We hereby submit for your consideration the following product instead of the specified item for the above project:

<u>Drawing</u>	<u>Spec. Sect. No.</u>	<u>Paragraph</u>	<u>Specified Item</u>
_____	_____	_____	_____

Proposed Substitution:

Attach complete information on changes to Drawings and/or Specifications which proposed substitution will require for its proper installation.

Submit with request all necessary samples and substantiating data to prove equal quality and performance to that which is specified. Clearly mark manufacturer's literature to indicate equality in performance.

Fill in blanks below:

A. Does the substitution affect dimensions shown on the Drawings?

Yes ___ No ___

If yes, clearly indicate the changes:

B. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution? Yes ___ No ___

C. What effect does substitution have on other Contracts or other Trades?

D. What effect does substitution have on construction schedule?

E. Manufacturer's warranties of the proposed and specified items are:
Same ___ Different ___ (Explain on attachment.)

F. Reason for request:

G. Itemized comparison of specified item(s) with the proposed substitution; list significant variations:
(Attach spread sheet if applicable)

H. Accurate cost data comparing proposed substitution with product specified:

I. Designation of maintenance services and sources:

(Attach additional sheets if required.)

CERTIFICATE OF EQUAL PERFORMANCE AND ASSUMPTION OF LIABILITY FOR EQUAL PERFORMANCE

The undersigned states that the function, appearance and quality are equivalent or superior to the specified item.

Submitted By: _____

Signature: _____

Title: _____

Firm: _____

Address: _____

Telephone: _____

Signature shall be by person having authority to legally bind his firm to the above terms. Failure to provide legally binding signature will result in rejection of proposed substitution.

For Use By Architect:

___ Accepted

___ Not Accepted

___ Accepted as Noted

___ Received Too Late

By: _____

Date: _____

Remarks: _____

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment. Contractor shall coordinate with owner.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including Application for Payment forms with Continuation Sheets.
 2. Submit the Schedule of Values to Owner at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 3. Sub-schedules: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values correlated with each phase of payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Submit draft of AIA Document G703 Continuation Sheets.
 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

8. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Times: Progress payments shall be submitted to Architect by the 25th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

D. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.

E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Owner will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.

2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

F. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Owner by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.

2. When an application shows completion of an item, submit final or full waivers.

3. Owner reserves the right to designate which entities involved in the Work must submit waivers.

4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.

- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Complete & Final Construction Schedule.
 4. List of Contractor's staff assignments.
 5. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 6. Initial progress report.
 7. Report of preconstruction conference.
 8. Certificates of insurance and insurance policies.
- I. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative provisions for coordinating demolition operations on Project including, but not limited to, the following:

1. Requests for Information (RFIs).
2. Project meetings.

- B. Related Sections:

1. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
2. Division 14 Section "Gearless Traction Elevators" for general installation, coordination drawings and efforts required for elevator modernization efforts.

1.2 DEFINITIONS

- A. RFI: Request from Owner, Architect, or Contractor seeking information from each other during demolition.

1.3 COORDINATION

- A. Coordination: Coordinate demolition operations to ensure efficient and orderly removal of each part of the Work. Coordinate demolition operations that depend on each other for proper removal and disconnection.

1. Schedule demolition operations in sequence required to obtain the best results where removal of one part of the Work depends on removal of other components, before or after its own removal.

- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other demolition activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's demolition schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Progress meetings.
5. Project closeout activities.

1.4 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 11. Contractor's signature.
 12. Attachments: Include sketches, descriptions, measurements, photos, coordination drawings, and other information necessary to fully describe items needing interpretation.
- C. RFI Forms: AIA Document G716 or Contractor's software-generated form with substantially the same content as indicated above, acceptable to Architect. Form type will be determined at the Pre-construction Conference.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
 - a. Requests for coordination information already indicated in the Contract Documents.
 - b. Requests for adjustments in the Contract Time or the Contract Sum.
 - c. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Maintain the log on a daily basis and make available for view to the Architect at any time requested. Submit log monthly. Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number including RFIs that were dropped and not submitted.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.5 PROJECT MEETINGS

- A. General: Contractor will schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Contractor will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Attendees: Authorized representatives of Owner, the Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for RFIs.
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - i. Distribution of the Contract Documents.
 - j. Submittal procedures.
 - k. Sustainable design requirements.
 - l. Use of the premises.
 - m. Work restrictions.
 - n. Working hours.

- o. Responsibility for temporary facilities and controls.
 - p. Construction waste management and recycling.
 - q. Parking availability.
 - r. Office, work, and storage areas.
 - s. Equipment deliveries and priorities.
 - t. First aid.
 - u. Security.
 - v. Progress cleaning.
3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Progress Meetings: Contractor will conduct progress meetings at weekly intervals.
- 1. Attendees: In addition to representatives of Owner, the Commissioning Authority, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of abatement operations.
 - 4) Access.
 - 5) Site utilization.
 - 6) Temporary facilities and controls.
 - 7) Progress cleaning.
 - 8) Quality and work standards.
 - 9) Status of correction of deficient items.
 - 10) Field observations.
 - 11) Status of RFIs.
 - 12) Status of proposal requests.
 - 13) Status of Change Orders.
 - 14) Documentation of information for payment requests.
 - 3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of demolition and construction during performance of the Elevator Modernization and Related Work, including the following:
1. Contractor's construction schedule.
 2. Daily demolition reports.
 3. Field condition reports.

1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 2. Predecessor Activity: An activity that precedes another activity in the network.
 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Float: The measure of leeway in starting and completing an activity.
1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
1. PDF electronic file.
 2. Paper copies – 3 copies or greater as determined by the Architect.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

- C. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
- D. Daily Construction Reports: Submit at weekly intervals or as directed by the Architect.
- E. Field Condition Reports: Submit at time of discovery of differing conditions.

1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice of Award to date of final completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 10 days, unless specifically allowed by Architect.
 - 2. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 - 3. Punch List and Final Completion: Include not more than 15 days for punch list prior to final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One Contract: Include a separate activity for each contract.
 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 4. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Use of premises restrictions.
 - e. Provisions for future construction.
 - f. Seasonal variations.
 - g. Environmental control.
 5. Work Stages: Indicate important stages of construction for each major portion of the Work.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final completion, and the following interim milestones:
1. Completion date if different from the Final Completion date.
- E. Recovery Schedule: When periodic update indicates the Work is 10 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule.
- F. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
1. Utilize Primavera, Prolog, or other operating system acceptable to the architect and owner.
- 2.2 CONTRACTOR'S DEMOLITION SCHEDULE (CPM SCHEDULE)
- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Start-up Network Diagram: Submit diagram within 14 days of date established for the Notice of Award. Outline significant demolition activities for the first 30 days of the project. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's demolition schedule using a time-scaled CPM network analysis diagram for the Work.
1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 14 days after date established for the Notice of Award.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
 2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

3. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to correlate with Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the start-up network diagram, prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Mobilization and demobilization.
 - b. Delivery.
 - c. Utility interruptions.
 - d. Installation.
 - e. Work by Owner that may affect or be affected by Contractor's activities.
 - f. Punch list and final completion.
 - g. Activities occurring following final completion.
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list. Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Principal events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Average size of workforce.
- G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in the Contract Time.

2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 7. Accidents.
 8. Meetings and significant decisions.
 9. Unusual events.
 10. Stoppages, delays, shortages, and losses.
 11. Meter readings and similar recordings.
 12. Emergency procedures.
 13. Orders and requests of authorities having jurisdiction.
 14. Change Orders received and implemented.
 15. Construction Change Directives received and implemented.
 16. Services connected and disconnected.
 17. Equipment or system tests and startups.
 18. Partial completions and occupancies.
 19. Substantial Completions authorized.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S DEMOLITION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their

assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

1.1 SUMMARY

- A. Action Submittals: Information that requires Architect's responsive action.
- B. Informational Submittals: Information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.2 PROCEDURES

- A. Electronic copies of CAD Drawings of the Contract Documents may be provided by Architect for Contractor's use.
- B. Processing Time (not to exceed):
 - 1. Refer to 140000 "Gearless Traction Elevators". All submittals are to follow the stated time requirements.
- C. Action Submittals:
 - 1. Number of Copies: Five.
 - 2. Action Submittals:
 - a. Product Data.
 - b. Shop Drawings.
 - c. Samples.
 - d. Product schedule or list.
 - e. Contractor's Construction Schedule.
 - f. Submittals Schedule.
 - g. Application for Payment.
 - h. Schedule of Values.
 - i. Subcontract list.
- D. Informational Submittals:
 - 1. Number of Copies: Five.
 - 2. Informational Submittals:
 - a. Coordination Drawings.
 - b. Contractor's Construction Schedule.
 - c. Qualification data.
 - d. Welding certificates.
 - e. Installer certificates.
 - f. Manufacturer certificates.
 - g. Product certificates.
 - h. Material certificates.
 - i. Material test reports.
 - j. Product test reports.
 - k. Research/evaluation reports.
 - l. Schedule of tests and inspections.

- m. Preconstruction test reports.
 - n. Compatibility test reports.
 - o. Field test reports.
 - p. Maintenance data.
 - q. Design data.
 - r. Manufacturer's instructions.
 - s. Manufacturer's field reports.
 - t. Insurance certificates and bonds.
 - u. Material Safety Data Sheets: Submitted directly to Owner.
- E. Delegated-design submittals.
- 1. Submittals: Reviewed and marked with approval stamp before submitting to Architect. "Rubber Stamped" submittals will be returned to the contractor un-reviewed.
- F. Contractor's Review:
- 1. Submittals: Reviewed and marked with approval stamp before submitting to Architect. "Rubber Stamped" submittals will be returned to the contractor un-reviewed.
- G. Architect's Action:
- 1. Action Submittals: Stamped with an action stamp and returned.
 - 2. Informational Submittals: Reviewed but not returned, or rejected if it does not comply with requirements.
 - 3. Submittals Not Required: May not be reviewed and may be discarded.

END OF SECTION 013300

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Reviewed": When used to convey Architect's action on Contractor's submittals, applications, and requests, "reviewed" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated. For standards and publications referenced in Chapter 35 of IBC 2006, and other codes referenced therein, the effective date shall be the date of the standard referenced in that code unless a more current publication is specified in the individual sections of this Project Manual.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

D. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA)	(800) 872-2253
	Architectural Barriers Act (ABA)	
	Accessibility Guidelines for Buildings and Facilities	(202) 272-0080
	Available from Access Board	
	www.access-board.gov	
CFR	Code of Federal Regulations	(888) 293-6498
	Available from Government Printing Office	(202) 512-1530
	www.gpoaccess.gov/cfr/index.html	
CRD		
DOD	Department of Defense Military Specifications and Standards	(215) 697-6257
	Available from Department of Defense Single Stock Point	
	www.dodssp.daps.mil	
DSCC	Defense Supply Center Columbus (See FS)	
	Environmental Protection Agency	(202) 272-0167
	Ariel Rios Building	
	1200 Pennsylvania Ave, NW	
	Washington DC 20460 www.epa.gov	
FED-STD	Federal Standard (See FS)	
FS	Federal Specification	(215) 697-6257
	Available from Department of Defense Single Stock Point	
	www.dodssp.daps.mil	
	Available from General Services Administration	(202) 501-1021
	www.fss.gsa.gov	
	Available from National Institute of Building Sciences	(202) 289-7800
	www.nibs.org	
FTMS	Federal Test Method Standard (See FS)	
ICC-ES ICC	Evaluation Service, Inc.	(800) 423-6587
	www.icc-es.org (562) 699-0543	

MIL	(See MILSPEC)	
MIL-STD	(See MILSPEC)	
MILSPEC	Military Specification and Standards Available from Department of Defense Single Stock Point www.dodssp.daps.mil	(215) 697-6257
NES	(Formerly: National Evaluation Service) (See ICC-ES)	
OSHA		
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(202) 862-5100
AAADM	American Association of Automatic Door Manufacturers www.aaadm.com	(216) 241-7333
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
GANA	Glass Association of North America	(785) 271-0208

	www.glasswebsite.com	
GRI	(Now GSI)	
GS	Green Seal (202) 872-6400 www.greenseal.org	
NGA	National Glass Association www.glass.org	(703) 442-4890
PDCA	Painting & Decorating Contractors of America www.pdca.com (314) 514-7322	(800) 332-7322
UL	Underwriters Laboratories Inc. www.ul.com (847) 272-8800	(800) 285-4476
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (847) 299-5200
C.	Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.	
BOCA	BOCA International, Inc. (See ICC)	
CABO	Council of American Building Officials (See ICC)	
IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICBO	International Conference of Building Officials (See ICC)	
ICBO ES	ICBO Evaluation Service, Inc. (See ICC-ES)	
ICC	International Code Council (Formerly: CABO - Council of American Building Officials) www.iccsafe.org	(703) 931-4533
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org (562) 699-0543	(800) 423-6587
NES	National Evaluation Service (See ICC-ES)	
SBCCI	Southern Building Code Congress International, Inc. (See ICC)	

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CPSC	Consumer Product Safety Commission www.cpsc.gov (301) 504-6816	(800) 638-2772
DOC	Department of Commerce www.commerce.gov	(202) 482-2000
DOD	Department of Defense www.dodssp.daps.mil	(215) 697-6257
DOE	Department of Energy www.eren.doe.gov	(202) 586-9220
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PHS	Office of Public Health and Science http://phs.os.dhhs.gov	(202) 690-7694
SD	State Department www.state.gov	(202) 647-4000
USDA	Department of Agriculture www.usda.gov	(202) 720-2791

E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CBHF	State of California, Department of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation www.dca.ca.gov/bhfti	(800) 952-5210 (916) 574-2041
CPUC	California Public Utilities Commission www.cpuc.ca.gov	(415) 703-2782

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Section:
 - 1. Division 01 Section "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.
- B. Temporary Electricity:
 - 1. Cost: By Contractor.
- C. Temporary Heating:
 - 1. Cost of Energy: By Contractor.
- D. Temporary Cooling:
 - 1. Cost of Energy: By Contractor
- E. Temporary Water Service:
 - 1. Cost of Water Used: By Contractor

1.3 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in and ICC/ANSI A117.1.

1.4 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS (As needed to secure site storage area)

- A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts.

2.2 TEMPORARY FACILITIES

- A. Toilet Facilities
- B. Storage Container (as needed)

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
 - 1. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
 - 2. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

- B. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - 1. Provide power service required from utility source.

3.3 SUPPORT FACILITIES INSTALLATION

- A. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- B. Parking: Provide temporary parking areas for construction personnel.
- C. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
- D. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."
- E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- B. Temporary Erosion and Sedimentation Control: Comply with requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- E. Site Storage Enclosure Fence: Before project set-up and mobilization operations begin, furnish and install site storage enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
 - 1. Extent of Fence: As required to enclose entire on site storage area or portion determined sufficient to accommodate construction operations as coordinated with the owner.
 - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

- G. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- H. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
 - 1. Prohibit smoking in construction areas.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

END OF SECTION 015000

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Disposing of nonhazardous demolition and construction waste.

1.3 DEFINITIONS

- A. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- B. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 IMPLEMENTATION

- A. General: Implement waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

3.2 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Burning: Burning of waste materials is not permitted on Owner's property,
- D. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 015240

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Related Sections include the following:
 - 1. Divisions 2 through 33 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:
 - 1. Primary operational systems and equipment.
 - 2. Air or smoke barriers.
 - 3. Electrical wiring systems.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, which results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017310

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Demolition and removal of selected portions of a building or structure.
 - 2. Repair procedures for selective demolition operations.
- B. Related Sections include the following:
 - 1. Division 1 Section "Summary" for use of the premises and phasing requirements.
 - 2. Division 1 Section "Construction Progress Documentation" for preconstruction photographs taken before selective demolition.
 - 3. Division 1 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
 - 4. Division 1 Section "Cutting and Patching" for cutting and patching procedures for selective demolition operations.
 - 5. Division 14 Section "Gearless Traction Elevators" for additional information associated with demolishing, cutting, patching, or relocating existing elevator items.
 - 6. Division 23 Sections for demolishing, cutting, patching, or relocating mechanical items.
 - 7. Division 26 Sections for demolishing, cutting, patching, or relocating electrical items.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- B. Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
- C. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's school faculty and students on-site operations are uninterrupted.
 - 2. Interruption of utility services.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevator and stairs.
 - 5. Locations of temporary partitions and means of egress.
 - 6. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- D. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.
- E. Pre-demolition Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.
- F. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.6 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Standards: Comply with ANSI A10.6 and NFPA 241.

- D. Pre-demolition Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
- E. Pre-demolition Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to selective demolition including, but not limited to, the following:
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

1.7 PROJECT CONDITIONS

- A. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
 - 1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.
- B. Owner assumes no responsibility for condition of areas to be selectively demolished.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. Hazardous materials will be removed by Owner before start of the Work.
 - 2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- D. Storage or sale of removed items or materials on-site will not be permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.
 - 1. If possible, retain original Installer or fabricator to patch the exposed Work listed below that is damaged during selective demolition. If it is impossible to engage

original installer or fabricator, engage another recognized experienced and specialized firm.

- a. Preformed metal panels.
- b. Firestopping.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
 1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 2. Use materials whose installed performance equals or surpasses that of existing materials.
- B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES

- A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.
- B. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.

1. Provide at least 72 hours' notice to Owner if shutdown of service is required during changeover.
- C. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.
1. Owner will arrange to shut off indicated utilities when requested by Contractor.
 2. Arrange to shut off indicated utilities with utility companies.
 3. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.
 4. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
- D. Utility Requirements: Refer to Division 15 and 16 Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.3 PREPARATION

- A. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
 2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
 3. Protect existing site improvements, appurtenances, and landscaping to remain.
 4. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
- C. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 4. Cover and protect furniture, furnishings, and equipment that have not been removed.

- D. Temporary Enclosures: Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
- E. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
- F. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.

3.4 POLLUTION CONTROLS

- A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
 - 1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
 - 2. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.
- B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- C. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.5 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.

2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
 5. Maintain adequate ventilation when using cutting torches.
 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 8. Dispose of demolished items and materials promptly.
 9. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
- B. Existing Facilities: Comply with building manager's requirements for using and protecting elevators, stairs, walkways, loading docks, building entries, and other building facilities during selective demolition operations.
- C. Removed and Salvaged Items: Comply with the following:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items: Comply with the following:
1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.
- F. Roofing: Remove no more existing roofing than can be covered in one day by new roofing. Refer to applicable Division 7 Section for new roofing requirements.

3.6 PATCHING AND REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.
- B. Patching: Comply with Division 1 Section "Cutting and Patching."
- C. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
 - 1. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.
- D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.
- E. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning: Do not burn demolished materials.
- C. Burning: Burning of demolished materials will be permitted only at designated areas on Owner's property, providing required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.
- D. Disposal: Transport demolished materials and dispose of at designated spoil areas on Owner's property.
- E. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION 017320

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

- 1. Inspection procedures.
- 2. Warranties.
- 3. Final cleaning.

- B. Related Sections include the following:

- 1. Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

- 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
- 2. Complete final cleaning requirements.

- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Owner will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Owner, that must be completed or corrected before certificate will be issued.

- 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
- 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection by the architect for determining date of Final Completion, complete the following:

- 1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
- 2. Submit certified copy of Substantial Completion inspection list(s) of items to be completed or corrected (punch list), endorsed and dated by the contractor. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance. Architect and owner will confirm.
- 3. Submit certified copy of Inspection list(s) from Authorities Having Jurisdiction (AHJ) of items to be completed or corrected (required corrective items), endorsed and dated by the contractor and signed off with Final Approval by the AHJ.

- B. Architect Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Owner will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Include the following information at the top of each page:

- a. Project name.
- b. Date.
- c. Name of Architect.
- d. Name of Contractor.
- e. Page number.

1.6 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Owner for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Remove tools, construction equipment, machinery, and surplus material from Project site.

- b. Provide corrections to site as required so that the site is left in the same condition that it was prior to the start of this project.
 - c. Leave Entire Project site clean and ready for Owner. This includes the site and the building areas of work related to this project.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

LIST OF DRAWINGS:

<u>DRAWING</u>	<u>DESCRIPTION</u>
T101	TITLE, INDEX & ABBREVIATIONS
A101	ELEVATOR PIT & BASEMENT LEVEL MODERNIZATION PLANS
A102	FIRST FLOOR THRU ELEVENTH FLOOR MODERNIZATION PLANS
A103	ROOF LEVEL / MACHINE ROOM DEMOLITION & MODERNIZATION PLANS
A104	ROOF LEVEL / MACHINE ROOM ACCESS STAIR & ENTRY
A105	ROOF LEVEL / PENTHOUSE ROOF LADDER
A106	ELEVATOR CAB PLANS & ELEVATIONS / FINISH & DOOR SCHEDULES
A107	EXISTING CONDITION PROJECT PHOTOGRAPHS
MD101	MECHANICAL - DEMOLITION PLAN
M101	MECHANICAL - FLOOR PLANS
M201	MECHANICAL – DETAILS, NOTES, SCHEDULES AND LEGEND
E001	ELECTRICAL SYMBOLS, NOTES, & DETAILS
E002	ELECTRICAL DEMOLITION PLAN
E101	ELECTRICAL PLAN

END OF SECTION 018000

FM00387491

USC Work Order

Description HAZMAT SURVEYCOLUMBIA HALL ELEVATORS

Site	COLUMBIA	Assigned To	JPROVENCE
Building	040 COLUMBIA HALL	Crew	HAZMAT
Floor	Room:	Start Date	Priority 1
Equipment		Due date	07-NOV-12
		Request Date	02-FEB-12
		by	CHAPMAS

Request #	FM00387491	Description	HAZMAT SURVEYCOLUMBIA HALL ELEVATORS
Parent WO #			

CP Number	CP00343190	COLUMBIA HALL ELEVATOR UPGRADES
------------------	------------	---------------------------------

State/Internal Project Number	H27-6008
--------------------------------------	----------

Requestor		Project Manager	FISHER, PETER L.
Telephone		Telephone	777-9346
Alternate		Estimated Cost	\$ 336.00
Telephone		Billing	FIXED PRICE
Non-Available Time			53100-W726-57120 (HOUSING ELEVATOR UPGRADES)

Task List
 (CHECK ALL THAT APPLY AND PROVIDE ADDITIONAL INFORMATION AS NEEDED)

HAZMAT SURVEY(S) REQUESTED FOR THE FOLLOWING

- FLOOR TILE
- JOINT COMPOUND
- WALLS
- MASTIC
- CEILING TILE
- PIPE INSULATION
- VINYL SHEET FLOORING
- FIREPROOFING
- FUME HOODS/TABLE TOPS
- ROOFING MATERIALS
- FIRE DOORS
- GASKETS/VALVES
- BOILER INSULATION
- ACOUSTICAL POPCORN CEILING
- DUCT WORK
- OTHER (PLEASE DESCRIBE BELOW)

MODERNIZE ELEVATORS - AREAS IMPACTED ELEVATOR SHAFT MACHINE ROOM, EQUIPMENT ROOMS, MAY RQUIRE NEW CONDUIT RUN FROM MCHINE ROOM TO MAIN ELECTRICAL ROOM WORK ON ELEVATOR DOOR FRAMES AND CALL STATIONS SURVEY PRIOR TO JUNE 30

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

Note Date Title

~~Supervisor's Approval~~~~12 NOV-12 HAZMAT SURVEY RESULTS~~

SURVEY DATE: 11/9/12

INSPECTOR #: DARRYL WASHINGTON II BI-00568

STATUS: THE FOLLOWING MATERIALS HAVE BEEN TESTED FOR ASBESTOS AND LEAD MATERIALS RESULTS FOLLOWS

STUCCO WALL MATERIALS (@ ELEVATORS ON EACH FLOOR)- NEGATIVE FOR ASBESTOS CONTAINING MATERIALS

TSI (PIPE INSULATION FROM LINE AT HOT WATER TANK IN BASEMENT)- NEGATIVE FOR ASBESTOS CONTAINING MATERIALS

TSI JOINTS (JOINTS FROM FIBERGLASS LINE IN ELEVATOR MECH RM)- NEGATIVE FOR ASBESTOS CONTAINING MATERIALS

JOINT COMPOUND (ELEVATOR MECH ROOM WALLS)- POSITIVE FOR ASBESTOS CONTAINING MATERIALS

SHEET ROCK (ELEVATOR MECH ROOM WALLS)- NEGATIVE FOR ASBESTOS CONTAINING MATERIALS

CEILING MATERIALS (ELEVATOR MECH ROOM)- NEGATIVE FOR ASBESTOS CONTAINING MATERIALS (IF THIS STYRAFOAM CEILING HAS ANY GLUE OR MASTIC DOTS BEHIND IT PLEASE CONTACT DARRYL WASHINGTON FOR FURTHER TESTING)

WHITE PAINTED STUCCO - NEGATIVE FOR LEAD BASE PAINT

BLUE PAINTED STUCCO WALL (1ST FLOOR)- NEGATIVE FOR LEAD BASE PAINT

INSPECTORS NOTES

ELEVATOR DOORS CONTAIN ASBESTOS FIREPROOFING, AND SHOULD BE REMOVED AND DISPOSED OF BY AN LICENSED ASBESTOS ABATEMENT EMPLOYEES PER USC HAZMAT CREW OR OUTSIDE CONTRACTOR. PER RON MAXFIELD THE CONTROLS IN THE ELEVATOR MACHINE ROOM HAVE ASBESTOS INSIDE THE PANELS, AND THIS MATERIAL SHOULD BE IDENTIFIED PER RON MAXFIELD AND REMOVED BY USCH HAZMAT CREW OR AN ASBESTOS ABATEMENT CONTRACTOR IF THIS IS BEING REMOVED.

IF YOU ENCOUNTER ANY SUSPECT MATERIALS IN PLACE AND DEEM IT SUSPECT FOR ASBESTOS AND IT IS NOT LISTED ABOVE PLEASE STOP WORK AND CALL THE ASBESTOS PROGRAM MANAGER FOR FURHTER TESTING OR ABATEMENT REFER TO THE SURVEY RESULTS DOCUMENT ATTACHED TO THE WO FOR DETAILED INFORMATION.

06-AUG-10 2009-08-17 BLDG COMPONENT ASBESTOS/LEAD EXPOSURE UPDATE

BELOW ARE THE ASBESTOS AND LEAD TESTING RESULTS FOR COLUMBIA HALL DORMITORY:

SHEET ROCK: NEGATIVE FOR ASBESTOS CONTAINING MATERIALS

JOINT COMPOUND: POSITIVE FOR ASBESTOS CONTAINING MATERIALS

CEILING SPRAY: NEGATIVE FOR ASBESTOS CONTAINING MATERIALS

WHITE WALL PAINT: NEGATIVE FOR LEAD BASE PAINT

COLUMBIA HALL HAS MISCELLANOUS FLOOR TILE AND MASTIC THAT MAY OR MAY NOT CONTAIN ASBESTOS CONTAINING MATERIALS

BLACK MASTIC IS PRESENT ON FIBERGLASS LINES ABOVE CEILING SPACE AS WELL AS ON THE HVAC DUCTS AND RETURNS

THIS MATERIAL (MASTIC) DOES CONTAIN ASBESTOS, NO SAWING OR DRILLING OF THIS MATERIAL

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



EMSL Analytical, Inc.

706 Gralin Street, Kernersville, NC 27284
Phone/Fax: (336) 992-1025 / (336) 992-4175
greensborolab@emsl.com

EMSL Order: 021207092
CustomerID: UNSC62
CustomerPO:
ProjectID:

Attn: **Darryl Washington**
University of South Carolina
743 Greene Street
Columbia, SC 29208

Phone: (803) 777-7000
Fax: (803) 777-7334
Received: 11/09/12 10:15 AM
Analysis Date: 11/9/2012
Collected:

Project: **Columbia Hall 040**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
1 021207092-0001	Stucco Wall Material	White Non-Fibrous Heterogeneous	<1%	Cellulose	100% Non-fibrous (other) None Detected
2 021207092-0002	Stucco Wall Material	Brown/Gray Fibrous Heterogeneous	2% 1%	Cellulose Glass	97% Non-fibrous (other) None Detected
3 021207092-0003	Stucco Wall Material	White Non-Fibrous Heterogeneous	<1%	Cellulose	100% Non-fibrous (other) None Detected
4 021207092-0004	Stucco Wall Material	Brown/Gray/White Fibrous Heterogeneous	2% 1%	Cellulose Glass	97% Non-fibrous (other) None Detected
5 021207092-0005	Stucco Wall Material	Gray Fibrous Heterogeneous	3%	Cellulose	97% Non-fibrous (other) None Detected
6 021207092-0006	Stucco Wall Material	Gray/Tan/White Non-Fibrous Heterogeneous	3% <1%	Cellulose Glass	97% Non-fibrous (other) None Detected
7 021207092-0007	Stucco Wall Material	White Non-Fibrous Heterogeneous	<1%	Cellulose	100% Non-fibrous (other) None Detected
8 021207092-0008	TSI (joints)	Tan Fibrous Heterogeneous	15% <1%	Min. Wool Cellulose	85% Non-fibrous (other) None Detected

Analyst(s)

Kristie Elliott (18)
Nicole Shutts (8)

Stephen Bennett, Laboratory Manager
or other approved signatory

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

Initial report from 11/09/2012 13:36:24

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Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
9 021207092-0009	TSI (joints)	Tan Fibrous Heterogeneous	15% Min. Wool	85% Non-fibrous (other)	None Detected
10 021207092-0010	TSI (joints)	Tan Fibrous Heterogeneous	15% Min. Wool <1% Cellulose	85% Non-fibrous (other)	None Detected
11 021207092-0011	Joint Compound	Grayish Non-Fibrous Heterogeneous		97% Non-fibrous (other)	3% Chrysotile
12 021207092-0012	Joint Compound				Stop Positive (Not Analyzed)
13 021207092-0013	Joint Compound				Stop Positive (Not Analyzed)
14 021207092-0014	Joint Compound				Stop Positive (Not Analyzed)
15 021207092-0015	Joint Compound				Stop Positive (Not Analyzed)
16 021207092-0016	Joint Compound				Stop Positive (Not Analyzed)

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Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
17 <i>021207092-0017</i>	Joint Compound				Stop Positive (Not Analyzed)
18 <i>021207092-0018</i>	TSI	Beige Fibrous Heterogeneous	20% Cellulose	80% Non-fibrous (other)	None Detected
19 <i>021207092-0019</i>	TSI	Beige Fibrous Heterogeneous	20% Cellulose	80% Non-fibrous (other)	None Detected
20 <i>021207092-0020</i>	TSI	Beige Fibrous Heterogeneous	20% Cellulose	80% Non-fibrous (other)	None Detected
21 <i>021207092-0021</i>	Ceiling Material	Tan/Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
22 <i>021207092-0022</i>	Ceiling Material	Tan/Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
23 <i>021207092-0023</i>	Ceiling Material	Tan/Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
24 <i>021207092-0024</i>	Ceiling Material	Tan/Yellow Non-Fibrous Heterogeneous		100% Non-fibrous (other)	None Detected

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Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
25 021207092-0025	Ceiling Material	Tan/Beige Non-Fibrous Heterogeneous		100% Non-fibrous (other)	None Detected
26 021207092-0026	Sheet Rock	Gray Fibrous Heterogeneous	2% Cellulose	98% Non-fibrous (other)	None Detected
27 021207092-0027	Sheet Rock	Gray Fibrous Heterogeneous	2% Cellulose	98% Non-fibrous (other)	None Detected
28 021207092-0028	Sheet Rock	Gray Fibrous Heterogeneous	2% Cellulose	98% Non-fibrous (other)	None Detected
29 021207092-0029	Sheet Rock	Beige Fibrous Heterogeneous	1% Cellulose 1% Glass	98% Non-fibrous (other)	None Detected
30 021207092-0030	Sheet Rock	Gray Fibrous Heterogeneous	2% Cellulose	98% Non-fibrous (other)	None Detected
31 021207092-0031	Sheet Rock	Gray Non-Fibrous Heterogeneous	2% Cellulose	98% Non-fibrous (other)	None Detected
32 021207092-0032	Sheet Rock	Gray Non-Fibrous Heterogeneous	1% Cellulose <1% Glass	99% Non-fibrous (other)	None Detected

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Asbestos Lab Services Chain of Custody

EMSL Order Number (Lab Use Only):

[Empty box for Order Number]

Kernersville, NC
706 Galin Street
Kernersville, NC 27284
PHONE: (336) 992-1025
FAX: (336) 992-4175

Company: University of South Carolina
Street: 743 Greene St
City/State/Zip: Columbia, SC 29201
Report To (Name): Darryl Washington II
Telephone: 803 917 0291
Project Name/Number: Columbia Hall

EMSL-Bill to: Same Different
If Bill to is Different note instructions in Comments**
Third Party Billing requires written authorization from third party

Fax: [Empty]
Email Address: washindh@fmc.sc.edu

Please Provide Results: Email [Empty] Purchase Order: [Empty] State Samples Taken: SC

Turnaround Time (TAT) Options* - Please Check

3 Hour 6 Hour 24 Hour 48 Hour 72 Hour 96 Hour 1 Week 2 Week

*For TEM Air 3 hr through 6 hr, please call ahead to schedule. *There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

<p>PCM - Air <input type="checkbox"/> Check if samples are from NY</p> <p><input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA</p> <p>PLM - Bulk (reporting limit)</p> <p><input checked="" type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%)</p> <p>Point Count</p> <p><input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%)</p> <p>Point Count w/Gravimetric</p> <p><input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%)</p> <p><input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NIOSH 9002 (<1%)</p>	<p>TEM - Air <input type="checkbox"/> 4-4.5hr TAT (AHERA only)</p> <p><input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312</p> <p>TEM - Bulk</p> <p><input type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5</p> <p>TEM - Water: EPA 100.2 Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking</p>	<p>TEM-Dust</p> <p><input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167)</p> <p>Soil/Rock/Vermiculite</p> <p><input type="checkbox"/> PLM CARB 435 - A (0.25% sensitivity) <input type="checkbox"/> PLM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - C (0.01% sensitivity) <input type="checkbox"/> EPA Protocol (Semi-Quantitative) <input type="checkbox"/> EPA Protocol (Quantitative)</p> <p>Other:</p> <p><input type="checkbox"/></p>
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Check For Positive Stop - Clearly Identify Homogenous Group Filter Pore Size (Air Samples): 0.8µm 0.45µm

Samplers Name: [Empty] Samplers Signature: [Empty]

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled

Client Sample # (s): - Total # of Samples: 32

Relinquished (Client): Date: Time:

Received (Lab): mv Date: 11/9/12 Time: 10:15

Comments/Special Instructions:
Bill To: University of South Carolina, 743 Greene St., Columbia, SC 29208
Attention: Darryl Washington II Phone: 803 917 0291 Email: washindh@fmc.sc.edu

Reset Form Print Form

7092

Stop Positive



Building # COLUMBIA HALL 040 Sample Analysis Lead Asbestos Date: 11-08-2012 Turn Around Time 24 HRS

Table with 7 columns: Area, Sample ID, Material Sampled, Material Location, F/NF, Cond, Quantity, Pot to Disturb. Contains 10 rows of inspection data.

License # ASBI-00568 FM# FM00411963 Signature [Signature] Requestor PETE FISHER

Send lab results in PDF format as soon as possible to: Ed Pitts 803-777-3296 720 College St. Columbia, SC 29208 EHP@fmc.sc.edu

Ty Russell 803-777-1208 720 College St. Columbia, SC 29208 NTRusse@fmc.sc.edu

Fax # 803-777-3990

Reset Form

7092

Print Form



Building # _____ Sample Analysis _____ Turn Around Time _____
Type of Analysis: Lead / Asbestos Date: _____

Area	Sample ID	Material Sampled	Material Location	F/NF	Cond	Quantity	Pot to Disturb
C	11	JOINT COMPOUND	ELEVATOR MECHANICAL ROOM ON SEAMS AND HOLES	F	G	<1000 SQ FT	LOW
C	12	JOINT COMPOUND	ELEVATOR MECHANICAL ROOM ON SEAMS AND HOLES	F	G	<1000 SQ FT	LOW
C	13	JOINT COMPOUND	ELEVATOR MECHANICAL ROOM ON SEAMS AND HOLES	F	G	<1000 SQ FT	LOW
C	14	JOINT COMPOUND	ELEVATOR MECHANICAL ROOM ON SEAMS AND HOLES	F	G	<1000 SQ FT	LOW
C	15	JOINT COMPOUND	ELEVATOR MECHANICAL ROOM ON SEAMS AND HOLES	F	G	<1000 SQ FT	LOW
C	16	JOINT COMPOUND	ELEVATOR MECHANICAL ROOM ON SEAMS AND HOLES	F	G	<1000 SQ FT	LOW
C	17	JOINT COMPOUND	ELEVATOR MECHANICAL ROOM ON SEAMS AND HOLES	F	G	<1000 SQ FT	LOW
D	18	TSI	BASEMENT MECHANICAL ROOM LINE @ TANK	F	G	5 LIN FT	LOW
D	19	TSI	BASEMENT MECHANICAL ROOM LINE @ TANK	F	G	5 LIN FT	LOW
D	20	TSI	BASEMENT MECHANICAL ROOM LINE @ TANK	F	G	5 LIN FT	LOW

License # _____ FM# _____ Signature _____ Requestor _____

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Ed Pitts 803-777-3296
720 College St.
Columbia, SC 29208
EHP@fmc.sc.edu

Ty Russell 803-777-1208
720 College St.
Columbia, SC 29208
NTRusse@fmc.sc.edu

Fax # 803-777-3990

7092



Building # _____

Sample Analysis

Type of Analysis: Lead / Asbestos Date: _____

Turn Around Time _____

Area	Sample ID	Material Sampled	Material Location	F/NF	Cond	Quantity	Pot to Disturb
E	21	CEILING MATERIAL (BROWN)	MATERIAL ON CONCRETE CEILING OF ELEVATOR RM	F	G	<1000 SQ FT	LOW
E	22	CEILING MATERIAL (BROWN)	MATERIAL ON CONCRETE CEILING OF ELEVATOR RM	F	G	<1000 SQ FT	LOW
E	23	CEILING MATERIAL (BROWN)	MATERIAL ON CONCRETE CEILING OF ELEVATOR RM	F	G	<1000 SQ FT	LOW
E	24	CEILING MATERIAL (BROWN)	MATERIAL ON CONCRETE CEILING OF ELEVATOR RM	F	G	<1000 SQ FT	LOW
E	25	CEILING MATERIAL (BROWN)	MATERIAL ON CONCRETE CEILING OF ELEVATOR RM	F	G	<1000 SQ FT	LOW
F	26	SHEET ROCK	ELEVATOR MECH ROOM	F	G	<1500 SQ FT	LOW
F	27	SHEET ROCK	ELEVATOR MECH ROOM	F	G	<1500 SQ FT	LOW
F	28	SHEET ROCK	ELEVATOR MECH ROOM	F	G	<1500 SQ FT	LOW
F	29	SHEET ROCK	ELEVATOR MECH ROOM	F	G	<1500 SQ FT	LOW
F	30	SHEET ROCK	ELEVATOR MECH ROOM	F	G	<1500 SQ FT	LOW

License # _____

FM# _____

Signature _____

Requestor _____

Send lab results in PDF format as soon as possible to:

Ed Pitts 803-777-3296
720 College St.
Columbia, SC 29208
EHP@fmc.sc.edu

Darryl Washington 803-777-2399
720 College St.
Columbia, SC 29208
WashinDH@fmc.sc.edu

Ty Russell 803-777-1208
720 College St.
Columbia, SC 29208
NTRusse@fmc.sc.edu

Fax # 803-777-3990

1.0 GENERAL

1.1 SCOPE: This section covers miscellaneous metal work, complete.

1.2 EXTENT: the extent of miscellaneous metal work is shown on the drawings and includes items fabricated from iron and steel shape, plates, bars, strips, tubes, cables, pipes and castings which are not a part of the structural steel or other metal systems in other sections of these specifications. **All metal work exposed to the exterior is to be galvanized.**

1.3 CODES AND STANDARDS: Comply with the provisions of the following codes, standards, and specs, except as otherwise shown and specified.

AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" and including "Commentary of the AISC Specifications".

AISC "Specification for the Design of Cold-Formed Steel Structural Members".

ASTM A6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".

1.4 QUALIFICATION FOR WELDING WORK: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

1.5 FIELD MEASUREMENTS: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of the work. However, do not delay job progress; allow for trimming and fitting wherever the taking of field measurements before fabrication might delay the work.

1.6 INSERTS AND ANCHORAGES: Furnish inserts and anchoring devices which must be set in concrete or built into masonry for the installation of miscellaneous metal work. Provide setting drawings, templates, instructions, and directions for installation of anchorage devices. Coordinate delivery of other work to avoid delay.

1.7 SHOP ASSEMBLY: Pre-assemble items in the shop to the greatest extent possible, so as to minimize field splicing and assembly of units at the project site. Disassemble units only to the extent necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.

1.8 SUBMITTALS: Submit shop drawings for the fabrication and erection of all assemblies of miscellaneous metal work, which are not shown completely by the manufacturer's data sheets. Include plans and elevations at not less than 1" to 1'-0" scale and include details of sections and connections at not less than 3" to 1'-0" scale. Show anchorage and accessory items.

2.0 PRODUCTS:

2.1 GENERAL: For the fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating, and application of surface finishes.

- 2.2 STRUCTURAL STEEL PLATES, SHAPES AND BARS:
- A. Structural-Size Shapes and Plates (except Plates to be bent or Cold-Formed: ASTM A36
 - B. Steel Plates to be bent or Cold-Formed: ASTM A283, Grade C.
 - C. Steel Bars and Bar-sized Shapes: ASTM A306, Grade 65, or ASTM A36.
- 2.3 GRAY IRON CASTINGS: ASTM A48, Class 30.
- 2.4 MALLEABLE IRON CASTINGS: ASTM A47, Grade as selected.
- 2.5 STEEL PIPE: ASTM A53, type as selected; Grade A; black finish unless galvanizing is required; standard weight (Schedule 40), unless otherwise shown or specified.
- 2.5 ALUMINUM: Comply with the following standards for the forms and types of aluminum for the required items of work. Provide alloy and temper as recommended by the aluminum producer.
- A. Extruded Shapes and Tubes: ASTM B221 or B308, as possible.
 - B. Plate: ASTM B209, alloy 5005-H-16 for anodic coatings.
 - C. Bars and Rods: ASTM B211.
 - D. Castings: ASTM B26 or B108, alloy No. 214.
- 2.07 ANCHORS:
- A. For Steel Work: Provide zinc-coated fasteners, with galvanizing complying with ASTM A153, for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required for the installation of miscellaneous metal items.
 - B. For Steel Work: Provide fasteners of the basic metal and alloys matching finished color and texture, as the metal being fastened, unless otherwise shown or specified.
- 2.10 Welding Electrodes and Filler Metal: Provide the type and alloy of filler metal and electrodes in compliance with the recommendations of the producer of the metal to be welded and as required for color match, strength and compatibility in the fabricated items.
- 2.11 Metal Primer Paint: Metal Primer Paint shall be Tnemec No. 99.
- 2.12 Galvanizing Repair Paint: High zinc dust content paint for re-galvanizing welds in galvanized steel, complying with Military Specs Nil-P-21035 (Ships).
- 2.13 Fabrication:
- A. General: Use materials of size and thickness shown, or if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.

1. Form Exposed Work: True to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approx. 1/32" unless otherwise shown. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
 2. Weld Corners and Seams continuously, complying with AWS recommendations. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.
 3. Form exposed Connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown, or, if not shown, Phillips flathead (countersunk) screws or bolts.
 4. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices as shown and as required to provide adequate support for intended use.
 5. Cut, Reinforce, Drill and Tap miscellaneous metal work as required to receive finish hardware and similar items.
 6. Use Hot-Rolled Steel Bars for work fabricated from bar stock, unless shown or specified to be fabricated from cold-finished or cold-rolled stock.
 7. Galvanizing: Provide a zinc-coating for those items shown or specified to be galvanized as follows:
 - a. ASTM A153 for galvanizing iron and steel hardware.
 - b. ASTM A123 for galvanizing rolled, pressed and forged steel shapes, plates, bars, and strip 1/8" thick and heavier.
 - c. ASTM A386 for galvanizing assembled steel products.
 8. Shop Painting: Shop paint miscellaneous metal work, except members or portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded and galvanized surfaces, unless otherwise specified. Apply one shop coat to fabricated metal items, except two coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.
- B. Carpenter's Iron Work: Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware are specified in Division 6 Sections. Manufacture or fabricate items of sizes, shapes and dimensions required. Furnish malleable iron washers for head nuts which bear on wood structural connections; elsewhere, furnish steel washers.
- C: Loose Steel Lintels: Provide loose structural steel shape lintels for openings and recesses in masonry walls and partitions as shown. Weld adjoining members together to form a single unit. Provide not less than 8" bearing at each side of openings, unless otherwise shown.
- D. Miscellaneous Framing and Support:
1. Provide Miscellaneous Framing and Supports which are not a part of the structural steel work, including, but not necessarily limited to hangers and bracing for folding doors, shelf angles, curb edge angles, as required to complete the work.

2. Fabricate Miscellaneous Framing and Supports to sizes, shapes and profiles shown. Except as otherwise shown, fabricate from brackets and splice plates and a minimum number of joints for field connection. Cut, drill, and tap units to receive hardware and similar items to be anchored to the work. Equip units with integrally welded anchor straps for casting onto poured concrete or building into masonry wherever possible. Furnish inserts if units must be installed after concrete is poured. (See concrete sections for installation of inserts). Except as otherwise shown, space anchors 2' - 0" o.c. and provide minimum anchor units of 1-1/4" x 1/4" x 8" steel straps. Galvanized miscellaneous frames and supports where indicated for exterior use.

3.0 EXECUTION

- 3.1 EXAMINATION OF CONDITIONS: Installer must examine areas and conditions under which miscellaneous metal items are to be installed. Notify contractor, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until the unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- 3.2 Preparation: Furnish setting drawings, diagrams, templates, instruction and directions for installation of anchorages, such as concrete inserts, anchor bolts and miscellaneous items have integral anchors, which are to be imbedded in concrete or masonry construction. Coordinate the delivery of such items to the project site.
- 3.3 Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal items to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- 3.4 Cutting, Fitting, and Placement:
 - A. Perform all Cutting, Drilling and fitting required for the installation of the miscellaneous metal items. Set the work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.
 - B. Fit Exposed Connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind joints smooth and touch up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
 - C. Do not cut or abrade Members with finished which cannot be completely restored in the field. Where cutting, welding, and grinding are required for fitting and jointing of the work, restore finishes to eliminate any evidence of such corrective work. Return items with such finishes to the shop for required alterations, followed by complete refinishing.
- 3.5 Setting Steel Railing and Handrails: Adjust rails and handrails prior to securing in place to ensure proper matching at butting joints and correct alignment throughout their length. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:

- A. Anchor posts in concrete by means of pipe sleeves previously set and anchored into concrete. After posts have been inserted into sleeves and properly aligned, weld continuously around the post and around the sleeve. Cover anchorage joint with a round metal flange finished to match post.
 - B. Anchor Railing Ends into concrete and masonry with round flanges welded to rail ends and anchored into wall construction with lead expansion shields and bolts, except where indicated otherwise.
- 3.6 Setting Standard Catalog Products: Set standard catalog products in accordance with manufacturer's shop drawings and installation recommendations.
- 3.7 Field Welding: Comply with AWS Code for the procedures of manual shielded metal-arc welding, the appearance of quality of welds made and the methods used in correcting welding work.
- 3.8 Touch-Up Painting: Refer to Section entitled "Painting" of these specifications for cleaning and touch-up painting of field welds, bolted connections and abraded areas of the shop paint on the miscellaneous metal (required immediately after erection and before proceeding with field painting).

END OF SECTION 055000

1.0 GENERAL

1.1 SCOPE: This section covers the patching of a warranted aggregate surfaced built-up roof system. All patching must match the existing roof system. The contractor is fully responsible for verifying the existing roof type and condition prior to bid. The roof patching on these projects will be primarily due to the new roof level stair , and roof ladder anchoring along with repair required for the Mechanical penetrations and equipment curbs.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS:
Section 076000 Flashing and Sheet Metal

1.3 QUALITY ASSURANCE:

- A. Roofing Contractor: Subcontract the roofing and associated work to a single firm specializing in the type roofing required, so that there will be undivided responsibility for the performance of the work.
- B. The roofing contractor shall be an approved installer of the specified roofing system. This requirement shall be met prior to submitting a bid.
- C. Certification from the manufacturer of materials bid, that the contractor is approved by the manufacturer for application of the roofing system being installed on this Project. The letter shall certify that the contractor has satisfactorily applied the type of roof specified on projects which have been completed and under warranty for at least five (5) years.

1.4 PRODUCT HANDLING, STORAGE AND DELIVERY:

- A. Deliver material in manufacturer's original, unopened containers with manufacturer's labels intact and legible.
- B. Deliver enough material to allow continuous work.
- C. Select and operate material handling equipment and store materials to keep from damaging existing construction or applied roofing.
- D. Store rolls of felt, cartons or drums of asphalt, cans of primers, cements and coating on end.
- E. Store material on clean, raised platforms, or in storage vans.
- F. Store and handle materials to protect them from:
 - 1. Moisture, whether due to rain, snow, or condensation.
 - 2. Damage by construction traffic
 - 3. Temperatures over 110 degrees F.
 - 4. Temperatures below 40 degrees F.
 - 5. Direct sunlight.
 - 6. Mud, dust, sand, oil, grease, and dirt.
- G. Immediately remove and dispose of wet materials.
- H. Comply with fire, safety, and environmental protection regulations.

1.5 JOB CONDITIONS:

- A. Apply all roofing and insulation in dry weather. Roofing shall stop when temperature is at 40° and falling.
- B. Replace or restore to original condition any materials or work damaged during construction.
- C. Protect paving and building walls adjacent to hoists and kettles.
- D. Vent plastic sheets, if used, to keep moisture from condensing and collecting on covered surfaces.
- E. Secure protective coverings against wind.

1.6 GUARANTEES:

- A. Applicator:
 - 1. Before work is accepted, furnish written guarantee for two (2) years covering repairs required to keep roof and flashings watertight.
 - 2. Guarantee must cover ordinary wear and tear of elements and defects due to faulty materials and workmanship.
- B. Roofing Manufacturer:
 - 1. The existing roof system is not known, however, the roofing contractor is responsible for confirming the existing roof type and the associated repairs in order to maintain the existing warranties prior to bid.
 - 2. The roofer shall comply with all requirements of the manufacturer to maintain the roof under warranty.

2.0 PRODUCTS

2.1 BUILT-UP ROOFING MATERIALS: All components shall be by Johns-Manville and matching the existing roofing system or approved equal. This is only if the existing roofing system manufacturer is no longer available. The contractor shall perform all necessary roof work as required for this project with minimal disturbance of existing roofing system and shall maintain the existing system warranty intact. Install in strict accordance with the manufacturer's written specifications.

2.2 PITCH POCKETS: Shall be provided for all conduits, pipes, mechanical supports, stair supports, etc. that extend thru roof that are not covered in another section of the specs. All pitch pockets by Roofing Contractor of 16 oz. copper.

3.0 EXECUTION

3.1 ROOFING SYSTEM: Shall be installed as per latest manufacturer's written recommendations.

- A. Roof Insulation where required:
 - 1. Apply only as much insulation as can be completely covered by the roof membrane on the same day.
- B. Roof Membrane: Install roof membranes in strict accordance with the roofing manufacturer's written instructions.
 - 1. Aggregate shall meet ASTM Specification D-1863 Washed River Stone.

- 3.2 PROTECTION OF ROOFING: The Roofing Contractor shall protect the existing roof from damage and shall advise the contractor of required procedures for surveillance and protection of the completed roofing and existing roof systems during the remainder of the construction period. At the time of final acceptance by the Owner, the roofing contractor shall inspect the roofing work and advise contractor (with copy to the Owner) of any deterioration or damage found.
- 3.3 RESTORATION OF ROOFING: Restore or repair deterioration or damage, so that there will be no question concerning the condition of the roofing and the associated work at the time of final acceptance.
- 3.4 Newly Installed Mechanical, Plumbing Equipment and Machine Room Entry Stairs: Flash all new: roof curbs; roof top packaged units, exhaust fans, supply fans, air intakes, relief vents, plumbing vents, etc, and any other equipment required on the roof by all trades in strict accordance with the existing system manufacturer.

END OF SECTION

1.0 GENERAL

1.01 SCOPE: This Section covers all flashing and sheet metal, including continuous soffit vents, other than exposed pre-finished trim, flashing and sheet metal to be furnished.

1.02 SUBMITTALS:

- A. Shop Drawings: Indicate material types, sizes, shapes, thicknesses, finishes, fabrication details, anchors, connections, expansion joints and relation to adjacent work. Details and profiles shall be drawing at full size scale.
- B. Product Data: Indicate product description, finishes and installation instructions, including interface with adjacent materials and surfaces.
- C. Samples: Submit as follows:
 - 1. Special finishes: 6" x 6" samples of manufacturer's standard colors for Architect's color selection.
 - 2. Manufactured items: 1'-0" length in style and finishes specified.

1.03 DELIVERY, STORAGE AND HANDLING:

- A. Handle materials to prevent damage to surfaces, edges and ends of sheet metal items. Reject damaged material and remove from project site.

1.04 JOB CONDITIONS:

- A. Protect prefinished and previously finished surfaces from damage or staining during performance of flashing and sheet metal work. Repair or replace damaged work to original condition.
- B. Prevent accumulation of solder, sealant, bitumen, or other materials on finished or exposed surfaces. Remove misplaced materials immediately.

1.05 WARRANTIES:

- A. Warrant flashing and sheet metal work to be free of defects in materials and workmanship. Warranty period shall be two years.
- B. Finish warranty: Warrant fluoropolymer coating to be free of checking, crazing, or peeling, chalking and fading, in accordance with coating manufacturer's standard warranty.

2.0 PRODUCTS

2.01 SHEET METAL MATERIALS:

- A. Architectural Metals: Shall be .040 pre-finished aluminum where shown on plans and as required for details. Colors shall be selected by the architect. Acceptable manufacturers:
 - 1. MBCI
 - 2. AMS
 - 3. McElroy
 - 4. Morin

5. Approved equal

- B. Pitch Pockets: Shall be manufactured of 16 oz. copper in size as required for conditions. Solder all seams. Provide circular copper covers soldered to or mechanically attached to all penetrations. Covers shall extend 2" beyond all edges.
- C. Parapet Covers: Where indicated, shall be by the metal roofing manufacturer as listed above. Joint covers of same metal shall have a 40 mil TPO membrane strip below them fully adhered to parapet covers in addition to caulk. The covers shall be anchored at the prescribed rate to achieve FM I-120 uplift resistance and in accordance with the wind uplift requirements of IBC2006.
- D. Lead Flashing at Plumbing Vents: Shall be of 4 lb lead turned into vent 1" minimum.
- E. Miscellaneous Metals: Shall be by the metal manufacturer or approved equal of colors as selected by architect from manufacturer's standard colors. All penetrations through metal roof must match the finish and color of the metal roof.

2.02 Fasteners: Same material or compatible with sheet metal being fastened.

- A. Nails: Flathead, needle point, not less than 12 ga. and of sufficient length to penetrate substrate 1" minimum.
- B. Expansion shields: Lead or bronze sleeves.
- C. Screws: Self-tapping type, with round heads.
- D. Bolts: Furnished complete with nuts and washers.
- E. Rivets: Round head, solid shank.
- F. Blind clips and cleats: Same gauge as sheet metal.
- G. Termination Bar: 1" high, continuous.

2.03 FINISHES:

- A. Pre-finished Metals: Manufacturer's standard Kynar 500 finish. Color as selected by architect.
- B. Copper: Natural Finish.

2.04 SHEET METAL FABRICATION:

- A. Fabricate sheet metal work in accordance with approved shop drawings and industry standards. Form sheet metal work with clear, sharp and uniform arises. Hem exposed edges.
- B. Make joints in aluminum sheets less than 0.040" thickness using flat seams, 3/4" in width. Fill seams with exterior sealant. Make joints in thicker sheets using seams or by Tungsten Arc Welding (TIG) or Gas Metal Arc Welding (MIG) process, using appropriate filler alloy.

- C. Provide linear sheet metal items in minimum 10'-0" sections except as otherwise noted. Form flashing using single pieces for the full width. Install coping covers, gravel stops, etc. in symmetrical distances from edges. Verify layouts with the architect prior to installation.

3.0 EXECUTION

3.01 SHEET METAL INSTALLATION:

- A. Install work in accordance with approved shop drawings and industry standards and SMACNA Sheet Metal Practices. Sheet metal items shall be true to line, without buckling, creasing, warp, wind or other deformation in finished surfaces.
- B. Perform field joining of lengths as specified for shop fabrication. Factory form and join interior and exterior corners and similar transactions.
- C. Isolate dissimilar materials to prevent electrolysis. Separate using bituminous paint or roofing felt, or uncured 40 mil membrane waterproofing.
- D. Seaming: Form seams in direction of flow. Seams shall be flatlock with cleats filled with exterior sealant. Lap seams occurring in members sloping 45° or more 4" minimum and bed in flashing cement.
- E. Secure sheet metal items using continuous cleats, clips and blind fasteners as indicated. No exposed face fastening shall be performed.
- F. Fastening:
 - 1. Nails: Confine to one edge only of flashing 1'-0" or less in width. Space Nails at 4" o.c. maximum. Provide neoprene washers for nails.
 - 2. Cleats: Continuous, formed to profile of item being secured.
 - 3. Clips: Minimum 2" wide by 3" long formed to profile of item being secured. Space at 2'-0" o.c. maximum.
- G. Form joints in linear sheet metal to allow for 1/2" minimum expansion at 20'-0" o.c. maximum and 8'-0" from corners. Provide 6" wide backup plate at intersections. Form plates to profile of sheet metal item. Set plate in three beads of sealant in addition to 40 mil uncured Permaply.

END OF SECTION 076000

1.0 GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 1 Specification sections, apply to work of this section.

1.02 SCOPE OF WORK

- A. Work includes sealing (caulking) of joints where indicated on drawings, specified herein, and where required for a complete weather tight installation. Typical locations include, but are not necessarily limited to, the following:
 - 1. Control and Expansion Joints.
 - 2. Metal Cap Flashings
 - 3. Where one partition or wall abuts another and is not structurally bonded.

1.03 DEFINITIONS:

- A. Sealant: A weatherproof elastomer used in filling and sealing joints, having properties of adhesion, cohesion, extendibility under tension, compressibility and recovery; shall be designed to make joints air and water tight. Material is designed generally for application to joints at exterior of structures and for other joints subject to movement.
- B. Caulking compound: A material used in filling joints and seams, having properties of adhesion and cohesion; shall not be required to have extensibility and recovery properties, usually applied to joints at interior of structures.
- C. Caulk: The process of filling joints, without regard to type of material.
- D. Joint failure: A caulked joint exhibiting one or more of the following characteristics:
 - 1. Leaks air and/or water
 - 2. Sealant migrates
 - 3. Sealant loses adhesion
 - 4. Sealant loses cohesion
 - 5. Sealant does not cure
 - 6. Sealant discolors
 - 7. Sealant stains adjacent work
 - 8. Sealant develops bubbles, air pockets or voids.

1.04 SUBMITTALS:

- A. Manufacturer's Data: Submit two copies of manufacturer's specifications, recommendations and installation instructions for sealant and associated miscellaneous material required. Include manufacturer's published data, or letter of certification, or certified test laboratory report indicating that material complies with requirements and is intended generally for applications shown. Show by transmittal that one copy of each recommendation and instruction has been distributed to Installer.
- B. Approval of Applicator: A letter on manufacturer's letterhead signed by an active company administrator certifying that applicator is approved at the time of bidding by manufacturer.

C. Color Samples:

1. Submit samples of manufacturer's standard and special colors as indicated at least 30 days prior to commencement of application.
2. Samples shall be actual materials or literature depicting actual material colors. Architect reserves the right to reject work not in conformance with selected colors, based upon samples submitted.
3. Should Contractor select a manufacturer meeting specified requirements, except for minimum color range requirements, he shall be responsible for furnishing special colors within range requirements. Special colors shall be submitted for Architect's acceptance.

D. Warranty: A warranty from the applicator upon completion guaranteeing the water tightness of the sealant installation for a period of five (5) years assuming responsibility for prompt and complete repair of any leaks occurring during this period. In addition, provide a letter on the manufacturer's letterhead at project close-out stating that work has been accomplished in accord with this specification and with manufacturer's application directive.

1.05 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer's instruction regarding environmental conditions under which materials may be stored.

1.06 JOB CONDITIONS:

A. Weather Conditions

1. Install no materials under adverse weather conditions, or when temperatures are below or above those recommended by the manufacturer.
2. Proceed with work only when forecasted weather conditions are favorable for joint cure and development of high early bond strength.
3. Wherever joint width is affected by ambient temperature variations, install materials only when temperatures are in lower third of manufacturer's recommended installation temperature. Coordinate time schedule with Contractor to avoid delay of project.

B. Protection of adjacent surfaces:

1. Protect by applying masking materials or manipulating application equipment to keep materials in joint. If masking materials are used, allow no tape to touch cleaned surfaces to receive sealant. Remove tape immediately after caulking, before surface skin begins to form.
2. Remove misapplied sealants from surfaces using solvents and methods recommended by manufacturer.
3. Restore surfaces from which sealants have been removed to original condition and appearance.

1.07 SERVICES OF MANUFACTURER'S REPRESENTATIVE

A. Manufacturer of sealant materials shall provide the services of a factory representative who shall conduct on site check of caulking work to determine compliance with manufacturer's application directive.

1.08 APPLICATORS

- A. Subcontract the caulking and sealing work to a firm experienced in the application of the types of materials required, employing skilled tradesmen for the work and who are approved by the manufacturer of the materials.

2.0 PRODUCTS

2.01 MATERIALS

- A. Sealant for Exterior Work: Provide two-component Polyurethane-based elastomeric sealant complying with FS TT-S-00227E, Type II (Non-Sag), Class A, and ANSI A116.1.

These materials shall be of sufficient strength and hardness to withstand stiletto heel traffic without damage or deterioration of sealer system.

DYNATROL II	by Pecora Corporation
SONOLASTIC NP II	by Sonneborn-Contech
DYMERIC II	by Tremco

- B. Caulking for Interior Work: Provide one-part acrylic latex polymer non-sag Caulking Compound complying with ASTM C834.

Products complying with requirements include, but not necessarily limited to:

AC-20	by Pecora Corporation
ACRYLIC LATEX	by Tremco
SONOLAC	by Sonneborn-Contech

- C. Sealant for Interior Horizontal Joints subject to Foot Traffic: Provide two part, cold-applied, chemically-curing, horizontal grade, elastomeric polyurethane Joint Sealant, complying with ASTM D 1850 and FS TT-S-00227E (3), Class A, Type 1.

Products complying with requirements include, but not necessarily limited to:

UREXPAN NR-200	by Pecora Corporation
THC-900	by Tremco
SONOLASTIC	by Sonneborn-Contech

- D. Fire stopping Caulks and Sealants as follows apply to all divisions of these specifications:

1. Penetration Sealants/Putty: Noncombustible penetrating items (metal conduits, steel pipe, EMT, copper):

- a. Biostop 500
- b. Dow Corning Firestop Sealants 2000
- c. 3M Brand "Fire Barrier" Caulk CP-25 and CP-25WB.

2. Intumescent Firestop Materials for use at openings and sleeves involving combustible penetrating items (plastic pipe, insulated pipe, or PVC coated, flexible cable).

- a. Biofireshield wrap strip
- b. Dow Corning Firestop Intumescent Wrap Strip 2002

c. 3M Brand "Fire Barrier" FS-195 Wrap Strip

3. UL Classification: Provide material classified by UL to provide Fire stopping equal to time rating of construction being penetrated.
4. Fire stopping materials shall be asbestos-free, emit no toxic or combustible fumes, and be capable of maintaining an effective barrier against flame, smoke, water and toxic gasses in compliance with U.L standards.
5. Fire stopping materials/systems shall be flexible to allow for normal movement of building structure and penetrating item(s) without affecting the adhesion or integrity of the system.
6. Fire stopping sealants shall be recessed and have acrylic caulking applied over the surface to allow for painting. Verify coverage of acrylic latex caulk with manufacturer.

2.02 COLORS:

- A. As selected by Architect from manufacturer's standard selection.
- B. Colors of caulk are multicolor and shall match masonry, windows, metal roof and other separate finishes as selected by the architect.

2.03 COMPATIBILITY:

- A. Before purchase of the specified sealant, investigate its compatibility with the joint surfaces, joint fillers and other materials behind or below the joint in the construction. Provide only materials (manufacturer's recommended variation of the specified materials) which are known to be fully compatible with the actual installation conditions, as shown by the manufacture's published data or certification.

2.04 ACCESSORY MATERIALS:

- A. Joint Cleaner: Type recommended by sealant manufacturer for substrates indicated.
- B. Joint Primer/Sealer: Provide type of joint primer/sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.
- C. Bond Breaker Tape (BB-Tp): Polyethylene tape or other plastic tape as recommended by sealant manufacturer to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self adhesive tape where applicable.
- D. Sealant Backer Rod: Compressible rod stock of polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam as recommended by sealant mfg. for compatibility with sealant material. Provide size and shape of rod to control joint depth, break bond at bottom of joint, form optimum shape of bead on back size to minimize possibility of extrusion when joint is compressed.
- E. Tooling agent: Agent recommended by sealant manufacturer to insure contact of material with inner joint faces.

- F. Divider strips: Synthetic rubber or closed cell synthetic foam not less than 1/6" thick and full depth of sealant; approved by manufacturers of dissimilar materials as being compatible with each other.

3.0 EXECUTION

3.01 JOB MOCKUP:

- A. Prepare, caulk and finish one sample of each joint condition.
- B. Sample joints shall be accepted by Architect prior to beginning work. Retain approved samples as a standard for work.
- C. Only neat tooled joints will be accepted.

3.02 JOINT SURFACE PREPARATION

- A. Installer must examine joint surfaces, backing and anchorage of units forming sealant rabbet and conditions under which sealant work is to be performed and notify Contractor in writing of any conditions detrimental to proper and timely completion of work. Do not proceed with sealant work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
- B. Clean joint surfaces immediately before caulking joints. Remove dirt, insecure coatings, moisture and other substances which could interfere with bond
- C. Etch concrete and masonry joint surfaces to remove excess alkalinity, unless sealant manufacturer's product data indicates that alkalinity does not interfere with bond and performance. Etch with 5% solution of muriatic acid; neutralize with dilute ammonia solution; rinse with clean water and allow to dry before caulking.
- D. Roughen joint surfaces on vitreous coated and similar non-porous materials, unless sealant manufacturer's product data indicates equal bond strength as porous surfaces. Rub with fine abrasive cloth or wool to produce dull sheen.

3.03 APPLICATION

- A. Comply with Sealant Manufacturer's printed instructions except where more stringent requirements are shown or specified and except where manufacturer's technical representative directs otherwise.
- B. Prime or Seal joint surfaces where recommended by sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.
- C. Install Sealant Backer Rod for all caulking materials, except where recommended to be omitted by sealant mfg. for application indicated.
- D. Employ installation techniques which will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joints to form a slight cove, so that joint will not trap moisture and dirt. Tool sealant as recommended by sealant manufacturer.
- E. Do not allow materials to overflow or spill onto adjoining surfaces. Use masking tape or other precautionary devices to prevent staining of adjoining surfaces.

- F. Remove excess and misplaced materials as work progresses. Clean adjoining surfaces to eliminate evidence of misplaced materials, without damage to adjacent surfaces or finishes.
- G. Cure Sealants in compliance with manufacturer's product data to obtain high early bond strength, internal cohesive strength and surface durability.
- H. Install sealants to depths as shown, or, if not shown, as recommended by the sealant manufacturer.
- I. Installer shall advise contractor of procedures required for protection of sealants and caulking compounds during construction period, so that they will be without deterioration or damage (other than normal weathering) at time of Owner's acceptance.

END OF SECTION 079000

- 1.0 GENERAL:
- 1.1 RELATED DOCUMENTS: Drawings and general provisions of Contract, including Divisions 0 (Bidding and Contract Documents), and 1 (General Requirements) apply to work specified in this section.
- 1.2 SCOPE: This section covers hollow metal work, complete. The extent of hollow metal work is shown on drawings and in schedules.
- 1.3 QUALITY ASSURANCE: Provide custom hollow metal work manufactured by a single firm specializing in the production of this type of work. Manufacturers offering products to comply with requirements of this specification include the following:
- Amweld
Curries/Assa Abloy
Republic
- 1.4 APPLICABLE STANDARDS: Hollow metal doors and frames shall be as manufactured by a member of the Steel Door Institute in accordance with the Institute's "Recommended Standard Steel Doors and Frame Details" (S.D.I. 111).
- 1.5 FIRE-RATED ASSEMBLIES: Wherever a fire-resistance classification is shown or scheduled for hollow metal work, provide fire-rated hollow metal doors and frames investigated and tested as a fire door assembly, complete with type of fire door hardware to be used. Identify each fire door and frame with UL labels, indicating applicable fire rating of both door and frame.
- A. Standard: Construction of assemblies to comply with NFPA Standard No. 80 and as herein specified.
- B. Temperature Rise Rating: At stairwell enclosures, provide doors which have a Temperature Rise Rating of not more than 450 degrees F. maximum on the unexposed side to 30 minutes of standard fire test exposure.
- 1.6 PRODUCT DELIVERY, STORAGE AND HANDLING: Deliver hollow metal work cartoned or crated to provide protection during transit and job storage. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided the finish items are equal in all respects to new work and are acceptable to the Architect; otherwise, remove and replace damaged items as directed. Store hollow metal units on raised platforms in vertical positions with blocking between units to allow air circulation. Keep stored material covered and protected from damage.
- 1.7 JOB CONDITIONS: The Installer must examine the substrate and conditions under which hollow metal work is to be installed and notify the Contractor in writing of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.
- 1.8 SUBMITTALS:
- A. Manufacturer's Data: For information only, submit two copies of manufacturer's specifications for fabrication and shop painting and installation instructions.
- B. Shop Drawings: Submit shop drawings for the fabrication and erection of custom hollow metal doors and frames. Include details of each frame type, thickness of metal,

elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements and details of joints, fastenings, anchors and connections.

2.0 PRODUCTS:

2.1 BASIC MATERIALS:

- A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A569 and ASTM A568.
- B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, Type E, matte finish, complying with ASTM A366 and ASTM A568. Provide stretcher-leveled standard of flatness for facing sheets of doors.
- C. Metallic Coated Steel Sheets: Commercial Steel (CS), Type B; with minimum **A60 (ZF180)** metallic coating, complying with ASTM A653/A 653M,
- D. Supports and Anchors: Provide units fabricated of not less than 16 gauge sheet steel. Galvanize after fabrication where units will be built into exterior walls, complying with ASTM A153, Class B.
- E. Inserts, Bolts and Fasteners: Provide manufacturer's standard units, except hot-dip galvanize all items to be built into exterior walls, complying with ASTM A153.
- F. Shop-Applied Paint: Provide a rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints, complying with FS TT-P-57 (Type II), TT-P-636, or TT-P-664. Paint galvanized surfaces with a zinc dust-zinc oxide primer complying with FS TT-P-641, Type II.

2.2 FABRICATION, GENERAL: Fabricate hollow metal units to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Wherever practicable, fit and assemble units in the manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at the project site. Weld exposed joints continuously, grind, dress and make smooth, flush and invisible. Metallic filler to conceal manufacturing defects is not acceptable.

- A. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips or Jackson heads for exposed screws and bolts.
- B. Clearance: Single swing doors shall have not more than a 1/8" clearance at jambs and heads, 1/8" clearance at meeting edges of pairs of doors, and 3/8" clearance at bottom. All dimensions are nominal and subject to recognized manufacturer's tolerance. The lock edges of doors shall be so designed as to provide proper operating clearance. Special bottom clearance shall be provided where thresholds require it.
 - 1. Fire rated doors shall have clearances as specified in NFPA Standard No. 80.
- C. Finish Hardware Preparation: Prepare hollow metal units to receive mortised and concealed finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 "Specifications for Door and Frame Preparation".

1. Reinforce hollow metal Units to receive surface applied hardware. Drilling and tapping for surface applied finish hardware may be done at project site.
 2. Locate finish hardware as shown on final shop drawings, or if not shown, in accordance with "Recommended Location for Building Hardware", published by the National Builders' Hardware Association.
 3. Fire-rated openings shall have been prepared for hardware in a manner that will not compromise the required fire rating.
- D. Shop Painting:
1. Clean, treat and paint all surfaces of fabricated hollow metal units, including galvanized surfaces, whether concealed or exposed in the finished work.
 2. Clean steel surfaces of all mill scale, rust, oil, grease, dirt and other foreign materials before the application of the shop coat of paint. Remove mill scale and rust by hand tool methods complying with SSPC-SP 2 and solvent clean all metal complying with SSPC-SP 1.
 3. Apply pretreatment to cleaned metal surfaces, using cold phosphate solution (SSPC-PT 2), hot phosphate solution (SSPC-PT 4) or basic zinc chromate-vinyl butyral solution (SSPC-PT 3).
 4. Apply shop coat of prime paint within the time limits recommended by the pretreatment manufacturer. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 2.0 mils.
- 2.3 FRAMES: Provide hollow metal frames for doors, transoms, side-lights, view window, borrowed lights and other openings, in sizes and profiles as indicated. All exterior hollow metal frames must be hot dipped galvanized.
- A. General: Pressed steel frames for doors, where indicated, shall be combination buck, frame and trim type. Frames shall be welded type with mitered head and jamb members. Corners shall be reinforced and have continuous welds. Exposed welds shall be filled and ground smooth to a level surface without dishing.
 - B. Frame Sheet Steel Thickness: The thickness of sheet metal used in constructing or fabricating frames shall be 14 gauge for single interior rated and non-rated frames and 12 gauge for all pairs of doors interior and exterior and single frames at exterior doors. Fabricate frames concealed stiffeners, reinforcement, edge channels louvers and moldings from either cold-rolled or hot-rolled steel at fabricator's option.
 - C. Mullions and Transom Bars: Provide closed or tubular mullions and transom bars where indicated. Fasten mullions and transom bars at crossing and to jambs by butt welding. Reinforce joints between frame members with concealed clip angles or sleeves same metal and thickness as frame. Where installed in masonry, leave vertical mullions in frames open at the top so they can be filled with grout.
 1. For fire-rated openings, do not provide a mullion or astragal at the meeting edges of a pair of doors for openings rated up to 90 minutes. See Section 082100 - "Wood Doors" for edge treatment of pairs of wood doors.
 - D. Wall Anchors: Furnish wall anchors as required to secure frames to adjacent construction, formed of not less than 18 gauge galvanized steel.

1. Masonry Construction: Adjustable, flat or corrugated or perforated, T-shaped to suit frame size with leg not less than 2" wide by 10" long. Furnish at least three anchors per jamb.
 2. Metal Stud Partitions: Insert type with notched clip to engage metal stud, welded to back of frame. Provide at least three anchors for each jamb for frames.
- E. Floor Anchors: Provide floor anchors for each jamb and mullion which extends to floor, formed of not less than 16 gauge galvanized steel sheet, as follows:
1. Monolithic Concrete Slabs: Clip type anchors, with two holes to receive fasteners, welded to bottom of jambs and mullions.
- F. Structural Reinforcing Members: Provide structural reinforcing members as part of frame assembly, where indicated at mullions, transoms, or other locations which are to be built into frame.
- G. Head Reinforcing: For frames over 4'-0" wide, provide two continuous steel angles not less than 2" x 2" x 12 gauge and width of opening, welded to back of frame at head, unless otherwise shown.
- H. Spreader Bars: Provide two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- I. Rubber Door Silencers: Drill stops to receive three silencers on single-door frames and four silencers on double-door frames. Install plastic plugs to keep holes clear during construction.
- J. Plaster Guards: Provide 26 gage steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

2.4 DOORS:

- A. Interior Doors: SDI-100, Grade II, heavy-duty, Model 2, minimum 18 gauge faces.
- B. Exterior Doors: SDI-100, Grade III, extra-heavy-duty, Model 2, minimum 16 gauge faces, galvanized.
- C. Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, only cold-rolled steel.
- D. "A" Label fire doors shall have minimum 16 gauge face plates.
 1. Door faces shall receive paint except as listed below.
- E. Thermal-Rated (Insulating) Assemblies:
 1. At exterior locations and elsewhere as shown or scheduled, provide doors which have been fabricated as thermal insulating door and frame assemblies and tested in accordance with ASTM C 236.

Unless otherwise indicated, provide thermal-rated assemblies with U-factor of 0.24 BTU/(hr*ft sq*deg F) or better.

- F. Door Hardware Reinforcement: Shall be a minimum of 12 gauge for hinges and be continuous channel for the full height of door, 12 gauge for closers and be a continuous channel for the full length of the header and 14 gauge for strikes and be a continuous channel for the full height of the door. 7 gauge reinforcements shall be used for hinges on frames. 26 gauge steel plaster guards or mortar boxes welded to the frame shall be provided at hardware cutouts where installed in concrete, masonry or plaster openings.
 - G. Door Louvers: Provide sightproof stationary louvers for interior doors where indicated, constructed of inverted V-shaped or Y-shaped blades formed of 24 gauge cold-rolled steel set into 20-gauge steel frame.
- 2.5 FIRE DOORS AND RELATED FRAMES: When required for either insurance rating purposes or for compliance to building codes (see Drawings), the fire door and frame assembly shall be of a type investigated and successfully fire tested in accordance with the ASTM designation E-152-41 or later revision. The assembly shall be identified by labels (or an identification marking) of the approving agency. The label on the door shall indicate the applicable fire test rating for the door construction furnished. Approved agencies shall include the Underwriters' Laboratories, Inc., the Underwriters' Laboratories of Canada, The Factory Mutual Laboratories, and other authorities having local or regional jurisdiction.
- 2.6 STOPS AND MOLDINGS: Provide stops and moldings around glazed panels in doors and frames where indicated.
- A. Form fixed stops and moldings integral with frame, unless otherwise acceptable to Architect. Provide fixed stops on inside of hollow metal units exposed to exterior and on corridor side of interior units, unless otherwise indicated.
 - B. Provide removable stops and molds at other locations, formed of not less than 20 gauge steel sheets; exterior, galvanized and interior cold-rolled. Secure with machine screws spaced uniformly not more than 12" o.c. Form corners with butted hair-line joints. Coordinate width of rabbet between fixed and removable stops with type of glass or panel and type of installation indicated.
- 3.0 EXECUTION:
- 3.1 GENERAL: Install hollow metal units and accessories in accordance with the final shop drawings and manufacturer's data and as herein specified.
- 3.2 SETTING MASONRY ANCHORAGE DEVICES: Provide masonry anchorage devices where required for securing hollow metal frames to in-place concrete or masonry construction. Set anchorage devices opposite each anchor location, in accordance with details on final shop drawings and anchorage device manufacturer's instructions. Leave drilled holes rough, not reamed, and free from dust and debris.
- 3.3 PLACING FRAMES: Set frames accurately in position, plumbed, aligned and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreaders leaving surfaces smooth and undamaged. Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames" unless otherwise indicated.
- A. In masonry construction, building-in of anchors and grouting of frames shall be performed as wall is laid up. Mortar may be used to grout frames only.
 - B. Place fire-rated frames in accordance with NFPA Standard No. 80.

- 3.4 DOOR INSTALLATION: Fit hollow metal doors, except fire-rated doors, accurately in their respective frames, with clearances specified in SDI-100. Place fire-rated doors with clearances as specified NFPA Standard No. 80. Doors shall be installed plumb and in true alignment in a prepared opening and be fastened to achieve the maximum operational effectiveness and appearance of the unit.
- 3.5 HARDWARE: Hardware shall be field applied.
- 3.6 ADJUST AND CLEAN:
- A. Prime Coat Touch-Up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
 - B. Protection Removal: Immediately prior to final inspection, remove protective plastic wrappings from prefinished doors.
- 3.7 FINAL ADJUSTMENTS: Check and readjust all operating finish hardware items in hollow metal work just prior to final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise damaged.

END OF SECTION 081100

1.0 GENERAL

1.1 SCOPE:

- A. Furnish complete finish hardware except as mentioned hereinafter as being provided by others.
- B. Provide Door Hardware as indicated in the **DOOR HARDWARE SCHEDULE** located on the drawings.

1.2 DETAILS

- A. Coordinate hardware for related trades such as metal doors and frames, etc.
- B. Immediately after receipt of the finish hardware purchase order, coordinate approved shop drawings from any affected trades.
- C. Hardware shall be delivered to the job site in the manufacturer's original packages. Each item shall be clearly marked with the opening number to identify proper locations.
- D. Contractor to provide a suitable storage space for hardware upon delivery to the job site. Store and handle to prevent damage or loss.

1.3 QUALIFICATIONS:

- A. As a mandatory requirement, all hardware shall be furnished by an established hardware firm who maintains and operates an office, display and stock. The firm shall be a regular authorized distributor of the locks, and related hardware that it proposes to furnish.
- B. All hardware for this project shall be scheduled and furnished by or under the direct supervision of a regular member of the American Society of Architectural Hardware Consultants who is also a full time of the firm. Factory representatives or other persons working with but not for, as a regular employee of the Hardware Supplier will not be considered all schedules submitted to the architect for approved and job use shall carry the signature of the consultant. The Hardware Consultant shall make periodical visits to the jobsite while Hardware is being installed & on completion of project he shall inspect the hardware for correct operation and installation of same and notify the architect in writing that this inspection has been made.

1.4 SUBMITTALS:

- A. Prepare and submit the complete detailed hardware schedule in accordance with Section - "Shop Drawings, Project Data & Samples".
- B. If requested, supply a sample of each hardware item as required, to be retained by architect for comparison with hardware furnished. Any deviation from hardware scheduled shall be replaced with the proper hardware. Samples will be returned in time for installation on the project. Tag for opening identification.

- D. Templates or template information shall be sent to each manufacturer who requires such information. (Example: Custom hollow metal door and frame manufacturers, etc.) An approved hardware schedule shall be sent to each manufacturer who required template information.

1.5 PRODUCT HANDLING:

- A. Hardware shall be ordered so that it will be available on time for job requirements.
- B. Locked storage space complete with shelving, for unpacking crates and sorting out hardware shall be furnished.
- C. If doors are field painted or finished, hardware shall be protected.

2.0 PRODUCTS:

2.1 MATERIALS:

- A. The Door Hardware is listed on the drawings.
- B. Any substitutions of hardware manufacturer's other than those listed in the hardware schedule must be approved in writing by the architect ten (10) days prior to bid date. Samples must be submitted upon request of the Architect.
- C. Finishes of items of hardware shall be as indicated.
- D. Ball Bearing Hinges - shall be Hager Stanley or McKinney
- E. Exit Devices shall be Von Duprin 99 Series as scheduled. No substitutions.
- F. Door Closers shall be LCN.
- G. Silencers shall be GJ64. Provide 3 silencers for single doors and two (2) silencers for pairs of doors.
- H. Thresholds shall be Pemko, Reese or National Guard Products.
- I. Fasteners. All items of hardware shall be supplied with correct fasteners such as wood
- J. Cores, Keys, Keying
 - 1. All locksets shall be furnished with a Best 7 pin interchangeable core. The owner will key the room as required. Contractor is to provide three cut keys with key code number stamped on bow of key.

3.0 EXECUTION:

3.1 HARDWARE LOCATION:

- A. A schedule of mounting heights for all items of hardware shall be included in hardware schedule for review.
- B. Degree of opening for doors with overhead holder, closers, etc., shall be included in hardware schedule for Architect's review.

3.2 INSTALLATION:

- A. All hardware shall be installed by carpenter mechanics, skilled in the application of institutional grade hardware.
- B. After installation, representative templates, instruction sheets, and installation detail, shall be placed in a file folder to be turned over to Owner when building is accepted. Include at least two (2) each of special adjusting tools furnished with hardware.
- C. After the building is occupied, arrange an appointment with the Owner's designated representative to instruct this person in the proper use, servicing, adjusting & maintenance of hardware.
- D. Special Emphasis will be placed on the care of and the installation on the Finished Hardware:
 - 1. Install hinges on doors for which they are scheduled and marked.
 - 2. Install locks on doors for which they are scheduled and marked.
 - 3. Do not remove labels on locks or cylinders this label has valuable keying references.
 - 5. Closers are to be provided with Sex Nuts and Bolts.
 - 6. All lock strikes are to be 4 7/8" unless so noted.

3.2 **DOOR HARDWARE SCHEDULE:** Shown on drawings. .

END OF SECTION 087100

1.00 GENERAL

- 1.01 SCOPE: This section covers normal gypsum drywall systems and gypsum drywall finishing complete.
- 1.02 EXTENT OF WORK: Extent of gypsum drywall work is shown on the drawings as ceilings.
- 1.03 CODES AND STANDARDS: Except as indicated or specified otherwise, comply with applicable requirements of American National Standards Institute (ANSI) Standard Specifications for Application and Finishing of Wallboard (ANSI A97.1-latest edition.)
- 1.04 DELIVERY AND STORAGE DELIVERY AND STORAGE OF MATERIALS: Coordinate delivery with installation to minimize storage periods at the project site. Deliver in manufacturer's unopened bundles or packages, fully identified with manufacturer's brand, name, type and grade. Protect from weather, soiling and damage using handling equipment and storage techniques recommended by the manufacturer.
- 1.05 EXAMINATION OF SUPPORTING STRUCTURE: Installer must examine all parts of the supporting structure to which gypsum drywall is to be applied and notify contractor, in writing, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- 1.06 TEMPERATURE AND HUMIDITY CONDITIONS: Do not install joint treatment compounds unless installation areas comply with the minimum temperature and ventilation requirements recommended by the drywall manufacturer and conditions are acceptable to the Installer.
- 1.07 CONSTRUCTION TOLERANCES FOR GYPSUM DRYWALL WORK: Do not exceed 1/8" in 8'-0" variation from plumb or level in any exposed line or surface, except at joints between units. Do not exceed 1/16" variation between plans of abutting edges or ends. Shim as required to comply with specified tolerances.
- 1.08 DISCREPANCIES: Architect shall be informed of discrepancies between this specification and manufacturer's printed literature as well as changes in recommendations prior to actual installation.
- 1.09 MANUFACTURERS: In order to define requirements of quality and function of manufactured products, the specifications are generally based upon products of US Gypsum Company. In addition to products of manufacturers named hereinafter, equivalent products of the following manufacturers will be acceptable under the base bid:
- Celotex
Georgia Pacific
Johns-Manville National Gypsum
- 1.10 PROTECTION OF FINISHED WORK: Installer shall advise Contractor of proper procedures for the protection of completed drywall work from damage or deterioration until acceptance of the work.
- 1.11 QUALIFICATION OF MECHANICS: Work of this section shall be performed by mechanics skilled in the erection of fire and sound rated metal drywall components and application of drywall finishing components, as applicable.

1.12 SUBMITTALS: For information only, submit two copies of the manufacturer's specs and installation instructions for each type of gypsum drywall and accessory required including other data as may be required to show compliance with these specifications. Indicate by transmittal form that copy of each instruction has been distributed to Installer.

2.00 PRODUCTS

2.01 MATERIALS FOR NORMAL DRYWALL SYSTEMS:

- A. Studs and Runners: Screw-type complying with ASTM C645-70. Provide studs of sizes shown with runners of compatible size for friction fit to studs. Fabricate from 20 gauge steel or heavier gauges as noted on plans with manufacturer's standard zinc protective coating. Provide cutouts in studs where shown or required to receive horizontal bracing.
- B. Rigid Furring Channels: Screw-type furring channels complying with ASTM C645-70, fabricated from 25 ga. steel with manufacturer's standard zinc protective coating.
- C. Wallboard: Comply with ASTM C36-73 or ASTM C630-70 as applicable to type of drywall board shown and specified.
 - 1. For exposed drywall surfaces, provide gypsum wallboard with paper-face surface suitable for receiving decorator finish and with long edges tapered or radial eased to receive manufacturer's standard joint.
- E. Laminating Adhesive: USG Joint Compound-taping or Durabond.
- F. Sound attenuation blankets shall be ThermaFiber by USG or approved equal sized to fit walls.
- H. Fasteners: USG Type S-12 and Hi-Lo Type S pan and bugle head screws, sizes as required.
- I. Accessories:
 - 1. USG Series 200 metal trim.
 - 2. USG 093 Control Joint. Install Control Joints at locations suggested by manufacturer, but no less than described in Section 3.04, C in this section. Consult architect for exact locations during drywall layout.

2.02 MATERIALS FOR DRYWALL FINISHING:

- A. Joint Reinforcement: spark perforated, cross laminated fiber tape meeting
- B. Water: Fresh, clean and potable water, free of ice crystals.
- C. Joint Compounds:
 - 1. Taping of embedding: USG Durabond, polyindurate hardening type joint compound.

2. Filling and Finishing: USG Ready-mixed Joint Compound-Topping, vinyl based premixed compound.

3.00 EXECUTION

3.01 GENERAL

- A. Manufacturer's Instructions: Unless otherwise shown or specified, install gypsum wallboard in accordance with manufacturer's printed instructions.

3.02 INSTALLATION OF SCREW-TYPE STUDS:

- A. Runner Tracks: Align runner tracks and secure runner tracks as recommended by the stud manufacturer for construction involved except do not exceed 24" o.c. spacing for nail or power-driven fasteners, or 16" o.c. for other types of attachment. Provide fasteners at all corners and ends of runner tracks. Caulk runner each side with acoustical sealant.
- B. Studs: Use full length studs between runner tracks wherever possible. If necessary, splice studs by nesting with a minimum lap of 8" and fasten laps with two screws through each flange. Friction fit studs to runner tracks by positioning and rotating into place. Provide positive attachment to runner track for studs located at partition corners and intersection and adjacent to openings, using 3/8" self-tapping screws or stud clinching tool on both flanges of studs.
- C. Size and Spacing of Studs: Comply with manufacturer's recommendations and as otherwise shown. Do not exceed 16 inches on center.
- D. Provide Rough Framing at Openings: Consisting of full-length studs adjacent to jambs and horizontal header and sill backs. Cut horizontal tracks to length and split flanges and bend webs at ends for flange overlap and screw to jamb studs. Install cut-to-length, intermediate studs between jamb studs at head and sill sections, at same spacing as full-length studs. Where vertical control joints are shown at jamb lines, provide additional vertical studs located at opening side of jambs and not less than 1/2" from jamb studs. Do not fasten such additional studs to tracks or jamb studs.
- E. Provide blocking for support of hardware, wall mounted items, and to prevent punch through by door handles.

3.03 INSTALLATION OF METAL FURRING:

- A. Provide Rigid Metal Furring Channels where gypsum wallboard is to be applied over masonry wall substrates, unless otherwise shown.
- B. Where indicated, install channels at not greater than 16" o.c. spacing and provide additional framing at openings, cutouts and corners. Fasten to concrete walls with power actuated fasteners.

3.04 INSTALLATION OF GYPSUM WALLBOARD

A. General

1. Standards: Comply with the requirements of ANSI A97.1 "Standard Specification for the Application and Finishing of Wallboard," unless otherwise specified or recommended by the manufacturer. The term "manufacturer" defines the gypsum wallboard manufacturer unless otherwise noted.
2. Provide drywall to the thickness shown, or if not shown, provide not less than the minimum thickness recommended by the manufacturer for the application.
3. Provide additional framing and blocking as required to support gypsum board at openings and cutouts, and to support built in anchorage and attachment devices for other work.

B. Metal Supports: Fasten gypsum wallboard with screws. Comply with manufacturer's instruction for fastening, but do not exceed 12" o.c. spacing.

C. Expansion Control: If not shown on plans provide expansion control joints on drywall walls, ceilings, soffit areas and at building control joints. Consult the architect for exact expansion joint locations. Joints shall be located at a minimum of:

1. Where partition runs exceed 30' without a break.
2. Where ceilings and soffits are greater than 30' runs and do not exceed 12' in width.
3. Where ceilings or wall areas exceed 300 sq. ft.
4. At the strike side of doors extending from the top of door frame to 8" above ceiling.

3.05 DRYWALL FASTENING:

- A. Temperature and Humidity Conditions: Do not install joint treatment compounds unless installation areas comply with the minimum temperature and ventilation requirements recommended by the manufacturer and conditions are acceptable to the Installer.
- B. Finish Exposed Drywall Surfaces with Joints, corners, and exposed edges reinforced or trimmed as specified and with all joints, fastener heads, trim accessory flanges and surface defects filled with joint compound in accordance with manufacturer's recommendations for a smooth, flush surface. Drywall finishing work will not be considered acceptable if corners or edges of not form true, level or plumb lintels, or if joints, fastener heads, flanges of trim accessories or defects are visible after application of field-applied decoration.

3.06 DRYWALL FINISHING:

- A. Use only compatible compounds from one mfg. After mixing, do not use joint compounds if recommended pot-life has expired.

- B. Allow drying time between applications of joint compound in accordance with manufacturer's recommendations for the relative humidity and temperature levels at the time of application. In no case allow less than 24 hours drying time between applications of joint compound.
- C. Drywall shall be finished per the following levels.

Level 1: All joints and interior angles shall have tape embedded in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.

Level 2: All joints and interior angles shall have tape embedded in joint compound. And one separate coat of joint compound applied over all joints, angles, fastener heads, and accessories. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.

Level 3: All joints and interior angles shall have tape embedded in joint compound. And two separate coat of joint compound applied over all joints, angles, fastener heads, and accessories. All joint compound shall be smooth and free of tool marks and ridges.

Level 4: All joints and interior angles shall have tape embedded in joint compound. And three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. All joint compound shall be smooth and free of tool marks and ridges.

**As a minimum, Level 4 finishing shall be required for this project where
GWB is exposed to view.**

END OF SECTION 092600

1.0 GENERAL

1.1 SCOPE: This section covers rubber flooring accessories complete. The extent of work is as shown on drawings and in schedules or if not shown as required at termination of carpet and resilient flooring edges or transitions as required.

1.2 RELATED DOCUMENTS:

- A. Drawings and General Provisions of contract, including general and supplementary conditions and Division 1 Specification Sections, apply to work of this section.

1.3 QUALITY ASSURANCE:

- A. Manufacturer: Provide each type of rubber flooring and accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds. All products shall be 100% asbestos free.
- B. Products as manufactured by one of the following and chosen by the Architect depending on color selections.
 - 1. Roppe Rubber Corporation

1.4 SUBMITTALS:

- A. Product Data: Submit two copies of manufacture's technical data and installation instructions for each type of rubber accessory.
- B. Samples: Submit two sets of samples of each type, color and finish of flooring and accessory required. Provide full-size tile units and 6" long sample of accessory. Include full range of flooring color and pattern variation. Sample submittals will be for reviewed for color, texture and pattern only. Compliance with all other requirements is exclusive responsibility of Contractor.

1.5 JOB CONDITIONS:

- A. Maintain minimum temperature of 65 degrees F (18 degrees C) in spaces to receive resilient flooring for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. Store flooring materials in spaces where they will be installed for at least 48 hours before beginning installation. Subsequently, maintain minimum temperature of 55 degrees F (13 degrees C) in areas where work is completed.
- B. Install rubber flooring and accessories after other finishing operations, including painting, have been completed. Do not install resilient flooring over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by manufacturer's recommended bond and moisture test.

2.0 PRODUCTS:

2.1 RUBBER MATERIALS:

- A. Flooring accessories shown in the finish schedule or listed herein as Cove Base or Wall Base shall be 1/8" TYPE TS THERMOSET VULCANIZED RUBBER COVE BASE. It shall be constructed of first-quality materials properly vulcanized and shall be smooth and free from imperfections which distract from its appearance. The base shall conform fully to the requirements of ASTM F-1861 Type TS (Thermoset Vulcanized Rubber).

All Cove Base shall be Standard Toe Base 5/8" with a height of 4" (unless otherwise indicated on Finish Schedule), available in lengths of 100' rolls, with a thickness of 1/8". Lengths of 48" and 120" may be provided for small applications when approved in advance by the architect. Provide pre molded inside corner units as noted on finish schedule. Color shall be selected by Architect equally priced to Pinnacle Series by Roppe.

- B. Rubber accessories shall be constructed of first quality materials properly vulcanized and shall be smooth and free from imperfections which distract from its appearance. These accessories shall conform full to the requirements of federal specifications SS-W-40A Type 1 rubber.
- C. Adhesives (Cements): Waterproof, stabilized type as recommended by flooring manufacturer to suit material and substrate conditions.

3.0 EXECUTION:

3.1 PREPARATION:

- A. Rubber Accessories: Shall be installed in accordance with manufacturer's recommendation. Immediately remove spots or smears adhesive as installation proceeds.

END OF SECTION 096610

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following exterior substrates:
1. Existing Stucco.
 2. Steel.
 3. Galvanized metal.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS:

The following categories of work are not included as part of the painter-applied finish work or are included in other sections of the specifications except as otherwise shown on drawings or specified herein.

1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under the various sections for structural steel, miscellaneous metal items, hollow metal work and shop-fabricated or factory built metal mechanical and electrical equipment or accessories.
2. Pre-Finish Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) metal toilet enclosures, acoustic materials, architectural woodwork and casework, finished mechanical and electrical equipment including light fixtures, switches, gear and distribution cabinets. Mechanical equipment that does not have finish paint will be painted under this section.
3. Concealed Surfaces: Unless otherwise indicated, painting is not required on wall or ceiling surfaces in concealed areas and inaccessible areas, such as foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts, and elevator shafts, as applicable to this project. Paint all piping, equipment and other items in these spaces as required.
4. Finish Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials shall not be painted, except as otherwise specified.
5. Operating Parts and Labels: Do not paint any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, motor and fan shafts, unless otherwise indicated. Do not paint over any code-required labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plates.
6. Colors: Provide as indicated on the drawings.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: 8 ½" x 11" minimum size for each finish and for each color and texture required.

1.4 LIST OF PROPOSED MATERIALS

- A. List of Proposed Materials: Verify, in writing, that products proposed are from products listed herein. This submittal shall include full identifying product names and catalog numbers. Materials for prime coats, undercoats, finish coats and thinning applied to same surface shall be produced by the same manufacturer.

1.5 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

- B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on benchmark samples.
 - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.6 DELIVERY AND STORAGE

- A. Deliver materials to job in original containers with labels intact and seals unbroken. Store materials and painters tools in a single room assigned for this use only. Keep storage place clean and neat and damage to it shall be corrected. Keep paint and other volatile material tightly covered at all times when not in actual use. Remove soiled and oily rags and waste from building every night and take every precaution to prevent spontaneous combustion.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.8 JOB, WEATHER, AND TEMPERATURE CONDITIONS

- A. Exterior painting: Do no exterior painting when temperature is below 50 degrees F., while surface is damp or during cold, foggy, rainy or frosty weather or when temperature is likely to drop to freezing within 24 hours. Avoid painting surfaces while they are exposed to hot sun. Allow 48 hours drying after rain before commencing painting.

1.9 COOPERATION WITH OTHER TRADES: Schedule this work and coordinate it with other trades and do not proceed until other work and/or job conditions are as required to achieve satisfactory results. Examine drawings and specifications for the work of various other trades and become familiar with all their provisions regarding painting. Surfaces that are left unfinished by requirement of other sections shall be painted or finished as part of the work covered by this section.

1.10 INSPECTION OF SURFACES:

- A. Examine surfaces to receive paint finishes, in accord with Contract Conditions, for defects which cannot be corrected by procedures specified herein under "Preparation of Surfaces" and which might prevent satisfactory painting results. Do not proceed with work until such defects are corrected. Commencing of work constitutes acceptance of surfaces and thereafter, Contractor shall be responsible for satisfactory results as required herein.
- B. Painting of Previously Painted Surfaces: The painter shall determine paint compatibility with specified products and surfaces previously painted. Should paints be non-compatible, notify the architect. Otherwise, lightly sand or treat surfaces as recommended by the manufacturer prior to installation of paint.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION AND APPLICATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- E. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.3 PREPARATION AND APPLICATION CLEANING: The Painting Contractor will not only protect his work at all times, but will also protect all adjacent work and materials by suitable covering or other method during the progress of his work. Upon completion of the work, he is to remove all paint and varnish spots from the premises, all rubbish and accumulated materials and he is to leave the work in a clean, orderly and acceptable conditions.

3.4 SCHEDULE OF MATERIALS: Material shall be selected from the following schedule, except as approved otherwise in accordance with the "Or Equal" Clause. All materials are Sherwin Williams, unless otherwise noted. Duron Paints, Benjamin Moore, PPG, ICI, and Glidden are approved equals.

3.5 EXTERIOR PAINTING SCHEDULE

A. CMU Substrates:

1. Latex System:

- a. Prime Coat: Preprite B25W25 Block Filler.
- b. Intermediate Coat: S-W A-100® Exterior Latex Flat, A6 Series (4 mils wet, 1.4 mils dry per coat).
- c. Topcoat: S-W A-100® Exterior Latex Flat, A6 Series (4 mils wet, 1.4 mils dry per coat). (gloss A8 series).

B. Existing Stucco Substrates:

1. Exterior Waterproof Latex System

- a. Conditioner: Loxon Conditioner A24W-100.
- b. Intermediate and Topcoat: Loxon Finish. A24 Series.

C. Steel Substrates (new and existing):

1. Water-based Acrylic System – Heavy Duty Performance:

- a. Spot Prime Coat: KemBond Universal Metal Primer, Gray.
- b. Intermediate Coat: SherCryl HPA B66 350/300 Series (gloss).
- c. Topcoat: SherCryl HPA B66 350/300Series (gloss).

D. Galvanized-Metal Substrates:

1. Latex Over Water-Based Primer System:

- a. Prime Coat: DTM Primer B66W1
- b. Intermediate Coat: SherCryl HPA B66 350/300 Series (gloss).
- c. Topcoat: SherCryl HPA B66 350/300Series (gloss).

END OF SECTION 099113

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Concrete.
2. Concrete masonry units (CMU).
3. Steel.
4. Galvanized metal.
5. Wood.
6. Gypsum board.
7. Cotton or canvas insulation covering.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS:

The following categories of work are not included as part of the painter-applied finish work or are included in other sections of the specifications except as otherwise shown on drawings or specified herein.

1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under the various sections for structural steel, miscellaneous metal items, hollow metal work and shop-fabricated or factory built metal mechanical and electrical equipment or accessories.
2. Pre-Finish Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) metal toilet enclosures, acoustic materials, architectural woodwork and casework, finished mechanical and electrical equipment including light fixtures, switches, gear and distribution cabinets. Mechanical equipment that does not have finish paint will be painted under this section.
3. Concealed Surfaces: Unless otherwise indicated, painting is not required on wall or ceiling surfaces in concealed areas and inaccessible areas, such as foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts, and elevator shafts, as applicable to this project. Paint all piping, equipment and other items in these spaces as required.
4. Finish Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials shall not be painted, except as otherwise specified.
5. Operating Parts and Labels: Do not paint any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, motor and fan shafts, unless otherwise indicated. Do not paint over any code-required labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plates.
6. Colors: Paint colors will be as selected by the Architect and before any painting is done the Architect will furnish the Contractor with the selected color schedule showing where the various colors will be applied. Finish colors shall exactly match the color chips. There will be a minimum of 14 colors used in this project. Color changes will be made at

accent walls in rooms, door frames to walls, soffits in ceilings, breaks in walls, flutes in columns, column details at bases, column detail at capitols and at other breaks, changes in planes and elsewhere as deemed necessary by the Architect.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For each finish and for each color and texture required.

1.4 LIST OF PROPOSED MATERIALS

- A. List of Proposed Materials: Verify, in writing, that products proposed are from products listed herein. This submittal shall include full identifying product names and catalog numbers. Materials for prime coats, undercoats, finish coats and thinning applied to same surface shall be produced by the same manufacturer.

1.5 QUALITY ASSURANCE

- A. MPI Standards:
 - 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
 - 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.
- B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
 - 2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
 - 3. Final approval of color selections will be based on benchmark samples.
 - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.6 DELIVERY AND STORAGE

- A. Deliver materials to job in original containers with labels intact and seals unbroken. Store materials and painters tools in a single room assigned for this use only. Keep storage place clean and neat and damage to it shall be corrected. Keep paint and other volatile material tightly covered at all times when not in actual use. Remove soiled and oily rags and waste from building every night and take every precaution to prevent spontaneous combustion.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
 - 1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.8 JOB, WEATHER, AND TEMPERATURE CONDITIONS

- A. Interior Painting: Maintain temperature in building at constant 65 degrees F. or above, during drying of plaster and masonry and provide adequate ventilation for escape of moisture from building in order to prevent mildew, damage to other work and improper drying of paint. Once painting has commenced, provide constant temperature of 65 degrees F. or above, and prevent wide variations in temperature which might result in condensation on freshly painted surfaces. Before painting is started in any area, broom clean it and remove excessive dust from all areas to be painted. Broom cleaning, after painting operations begin in a given area will not be allowed; cleaning shall then be done with only commercial vacuum cleaning equipment. Provide adequate illumination in all areas where painting operations are in progress.

1.9 COOPERATION WITH OTHER TRADES: Schedule this work and coordinate it with other trades and do not proceed until other work and/or job conditions are as required to achieve satisfactory results. Examine drawings and specifications for the work of various other trades and become familiar with all their provisions regarding painting. Surfaces that are left unfinished by requirement of other sections shall be painted or finished as part of the work covered by this section.

1.10 INSPECTION OF SURFACES:

- A. Examine surfaces to receive paint finishes, in accord with Contract Conditions, for defects which cannot be corrected by procedures specified herein under "Preparation of Surfaces" and which might prevent satisfactory painting results. Do not proceed with work until such defects are corrected. Commencing of work constitutes acceptance of surfaces and thereafter, Contractor shall be responsible for satisfactory results as required herein.
- B. Painting of Previously Painted Surfaces: The painter shall determine through a representative employed by the paint manufacturer, the paint's compatibility with specified products and surfaces previously painted. Should paints be non-compatible, notify the architect. Otherwise, lightly sand or treat surfaces as recommended by the manufacturer prior to installation of paint. **The manufacturer is to provide a written statement for each project indicating his findings and recommendations. This letter is to be included as part of the submittal data and written on paint manufacturer's letter head.**

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
4. Floor Coatings: VOC not more than 100 g/L.
5. Shellacs, Clear: VOC not more than 730 g/L.
6. Shellacs, Pigmented: VOC not more than 550 g/L.
7. Flat Topcoat Paints: VOC content of not more than 50 g/L.
8. Nonflat Topcoat Paints: VOC content of not more than 150 g/L.
9. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
10. Floor Coatings: VOC not more than 100 g/L.
11. Shellacs, Clear: VOC not more than 730 g/L.
12. Shellacs, Pigmented: VOC not more than 550 g/L.
13. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
14. Dry-Fog Coatings: VOC content of not more than 400 g/L.
15. Zinc-Rich Industrial Maintenance Primers: VOC content of not more than 340 g/L.
16. Pre-Treatment Wash Primers: VOC content of not more than 420 g/L.

C. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
2. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.

- h. Di-n-butyl phthalate.
- i. Di-n-octyl phthalate.
- j. 1,2-dichlorobenzene.
- k. Diethyl phthalate.
- l. Dimethyl phthalate.
- m. Ethylbenzene.
- n. Formaldehyde.
- o. Hexavalent chromium.
- p. Isophorone.
- q. Lead.
- r. Mercury.
- s. Methyl ethyl ketone.
- t. Methyl isobutyl ketone.
- u. Methylene chloride.
- v. Naphthalene.
- w. Toluene (methylbenzene).
- x. 1,1,1-trichloroethane.
- y. Vinyl chloride.

D. Colors: As selected by Architect from manufacturer's full range.

2.2 PREPARATION AND APPLICATION CLEANING: The Painting Contractor will not only protect his work at all times, but will also protect all adjacent work and materials by suitable covering or other method during the progress of his work. Upon completion of the work, he is to remove all paint and varnish spots from the premises, all rubbish and accumulated materials and he is to leave the work in a clean, orderly and acceptable conditions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (CMU): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION AND APPLICATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
- 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
 - C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
 - D. Painting Mechanical and Electrical Work: Paint only walls and floor in equipment rooms when scheduled, unless noted otherwise. Paint items exposed in equipment room spaces (when indicated) and occupied spaces including, but not limited to, the following:
 - 1. Mechanical Work:
 - a. Uninsulated metal piping.
 - b. Pipe hangers and supports.
 - c. Tanks that do not have factory-applied final finishes.
 - d. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 - e. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - f. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 - 2. Electrical Work:
 - a. Switchgear.
 - b. Panelboards.
 - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.
 - E. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
 - F. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.3 SCHEDULE OF MATERIALS: Material shall be selected from the following schedule, except as approved otherwise in accordance with the "Or Equal" Clause. All materials are Sherwin Williams, unless otherwise noted. Duron Paints, Benjamin Moore, PPG, ICI, and Glidden are approved equals.

3.4 INTERIOR PAINTING SCHEDULE

A. Existing Painted Concrete Floor Substrates, Light Traffic Surfaces):

1. Existing Painted Surface:(contractor to confirm existing floor finish is oil-based prior to bid:
 - a. First Coat: Industrial Urethane Alkyd Enamel. B54W-151 Series
 - b. Finish Coat: Industrial Urethane Alkyd Enamel. B54W-151 Series

B. CMU & Concrete Substrates:

1. Existing Non-painted Construction:
 - a. Prime Coat: A24 W300 Masonry Primer.
 - b. Intermediate Coat: ProMar 200,0-VOC Latex Eg-Shel (B20W6251 Series)
 - c. Topcoat: ProMar 200,0-VOC Latex Eg-Shel (B20W6251 Series)

C. Steel Substrates (also includes elevator frames at Lobbies to be spray painted):

1. Industrial Enamel System:
 - a. Spot Prime Coat: KemBond Universal Metal Primer, Gray.
 - b. Intermediate Coat: Metalastic DTM Enamel B55 Series. (semi-gloss).
 - c. Topcoat: Metalastic DTM Enamel B55 Series. (semi-gloss).

D. Dressed Lumber Substrates: Interior wood trim:

1. Industrial Enamel System:
 - a. Prime Coat: B19WV1002 Acrylic Primer 102.
 - b. Intermediate Coat: ProMar 200,0-VOC Latex (B31W2651 Series) (semi-gloss).
 - c. Topcoat: ProMar 200,0-VOC Latex (B31W2651 Series) (semi-gloss).

E. Existing Wood Floor Panel Substrates (wood floor at Radio Room):

1. Industrial Urethane System:
 - a. Intermediate Coat: Metalastic DTM Enamel Black B55B-Z0600. (semi-gloss).
 - b. Topcoat: Metalastic DTM Enamel Black B55B-Z0600. (semi-gloss).

F. New Gypsum Board Substrates:

1. Latex System:
 - a. Prime Coat: Preprite 200 Latex Wall Primer B28W200.
 - b. Intermediate Coat: ProMar 200, 0-VOC Latex Eg-Shel (B20W2651 Series)
 - c. Topcoat: ProMar 200, 0-VOC Latex Eg-Shel (B20W2651 Series)

G. Existing Gypsum Board and Plaster Substrates:

1. Latex System:

- a. Prime Coat: DTM Bonding Primer B66 A50.
- b. Intermediate Coat: ProMar 200, 0-VOC Latex Eg-Shel (B20W2651 Series)
- c. Topcoat: ProMar 200, 0-VOC Latex Eg-Shel (B20W2651 Series)

H. Cotton or Canvas Insulation-Covering Substrates: Including pipe and duct coverings.

1. Latex System:

- a. Prime Coat: B51W20 Preprite Primer / Sealer
- b. Intermediate Coat: ProMar 200 Latex Flat (B30W200 Series)
- c. Topcoat: ProMar 200 Latex Flat (B30W200 Series)

END OF SECTION 099123

SECTION 140000

GEARLESS TRACTION ELEVATORS

PART I GENERAL

1.1 GENERAL PROVISIONS

1.1.1 Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

1.2.1. Provide both the labor and materials to modernize three (3) geared traction elevators with three (3) gearless traction elevators specified herein.

1.3 WORK INCLUDED:

1.3.1 Provide labor, materials and equipment necessary to complete the work identified in this Section, including but not limited to the following:

1.3.1.1 Provide labor, materials, products, equipment and services necessary to complete the modernization of the current three (3) geared traction elevators their replacement with new gearless traction elevators specified herein.

1.3.1.2 The publications listed below form part of this specification to the extent referenced. The publications are referenced in the text by designation only.

1.3.1.3 Safety Standards for Elevators and Escalators ASME A17.1-2010, ASME A17.3-2011, NFPA 70 NEC, ICC/ANSI A117.1-2008.

1.3.1.4 Elevator and Escalator Electrical Equipment ASME-A17.5-2000 /CSA B44 - 2011

1.3.1.5 Where codes, standard details and other standards are referenced, latest adopted editions and amendments shall apply as specified. These gearless traction elevators shall meet Local, National, Federal and States applicable Codes for this project. Where a conflict in codes is evident the more stringent code shall apply unless it is contrary to the Authority Having Jurisdiction.

1.4 **WELDING**

1.4.1 Welder Qualifications: The quality of welding and welding procedures shall be determined by testing the welder's ability to make sound welds, under standard working conditions with the equipment to be used in the work for this project and in conformance with W59-03 (R2008). Submit certified copies of the qualifications for each welder that will be employed on this contract. Each welder shall identify his work with a code marking. Furnish a listing of the names of the welders with their corresponding code marks.

1.4.2 Welding and Burning: The Contract work shall be performed by experienced field mechanics in a workmanlike manner. The use of field welding in any portion of the elevator installation will not be allowed without prior approval from the Architect/Owner. Employment of bolts, lock washers, flat washers, hillside washers and nuts in the work shall be the only approved method of structural fastening. The random torching and welding of structural members by field mechanics shall not be allowed.

1.5 **DEBRIS**

1.5.1 Removal of Debris: All equipment removed as part of the modernization belongs along with packing cartons and creates to the installer and shall be removed from the job site expeditiously at the Elevator Contractors expense without delay.

1.6 **SUBMITTALS**

1.6.1 Submit manufacturer's brochures, layout drawings, samples and submit a completion schedule for approval prior to the fabrication or delivery of materials and equipment. In no case shall these documents be submitted more than thirty (30) days after Contract Award unless otherwise noted. Allow 14 days calendar days for review and approval by the Architect/Owner. If re-submittals are required they shall be returned to the architect within 14 days. They shall contain enough detailed information to confirm that the equipment and completion dates shall conform to the requirements of this specification and General Contractor's elevator installation time line completion dates. These submittals shall not contain less than the following information:

- a. Layout drawings shall depict the location and arrangement of machinery and control equipment in the hoistways, secondary's, machine room and pits. Coordinate with owner and field visit site for confirmation of existing conditions and dimensions for inclusion in submittals.
- b. Drawings and catalog cut sheets for all new equipment specified including controllers, car tracking system, gearless machines, car interiors, landing door hardware complete, 3 D door protective system, car exhaust fan, landing and car fixtures, return panels, car and counterweight roller guides, new whisper flex

chains, car and hall fixtures including cover plates.

- c. Complete information on machines, solid state drive control, brakes, signal system and controllers. Provide total weight of equipment components supplied.
- d. Include details of drive machine / deflector and controller fastening and restraints. Provide calculations certified by a licensed structural P.E. engineer.
- e. Engineering Abstracts: Provide a detailed listing of equipment that is to be supplied to this project. A formal copy of the engineering and sales abstract sheets shall be submitted.
- f. In seismic risk zone 2 or greater, include details of equipment foundations, restraints and details for earthquake protection.
- g. BTU Output: Provide total equipment BTU output for the controller, AC VVVF drives (Only provide regenerative drives), step up transformers, isolation transformers, and the gearless machines under full load conditions at 240 starts/hr (full load up RMS).
- h. Completion Schedule: The commencement date for all elevator modernization field activities on site shall be 15 May 2013 with a final completion date of 29 July 2013. This final completion date shall include all final state and consultant inspections and re-inspections and the 100% correction of all state and consultant deficiency listings. The one (1) year full service maintenance period coupled with the release of final retention funds shall not commence until all state and consultant deficiencies have been 100% corrected. Supply a CPM schedule for each elevator, containing all of the informational details necessary to permit complete monitoring of the work progress, including such activities as engineering, equipment approvals, manufacturing, equipment delivery, as well as individual installation events and completion dates for each elevator and related building interfacing activities. This schedule shall also contain dates when "Work identified in other Sections" is required to be complete in order to realize the anticipated completion dates. Arrange the schedule to show the anticipated construction progress, including estimated time allowances for each construction work activity required to facilitate the elevator installation. Provide, for each activity in the schedule, elapsed time (days), expended time (team hours or mechanic hours), actual number of constructors used to perform each activity and accumulated event days (total number and associated calendar date). The contractor must provide all materials and labor as required to meet the below listed elevator modernization schedule:

Start on site Construction:	May 15, 2013
End Construction 100% Completion	July 29, 2013
Including correction of all deficiencies:	

- l. Progress Payment Verification Documents: Supply actual detailed labor estimates for each elevator. These detailed labor estimates shall identify both the number of mechanic hours associated with each work activity and the percentage of total installation mechanic hours associated with each work activity. These individual labor estimate updates shall be submitted in conjunction with detailed material listings for each elevator each month with a summary dollar amount.
- j. Illuminated hall call push button and cover plate assembly, completely fabricated to demonstrate design, finish and method of mounting.
- k. Complete applied hall lantern assembly.
- l. Car and main lobby car position and direction indicator.
- m. One car and hall call push button assembly.

1.6.2 Operation, Maintenance and Adjustment Manuals:

- a. Furnish three (3) complete sets of bound operating, maintenance and adjustment manuals specific for this installation. The operating portion shall be bound separately from maintenance and adjustment portion. Explain in detail any components or methods peculiar to a particular system. Furnish one (1) complete manual prior to the time that the equipment tests are performed. Furnish the remaining manuals before the Contract is completed. The following identification shall be inscribed on the cover:

OPERATION, MAINTENANCE AND ADJUSTMENT MANUALS
BUILDING NAME.....
EQUIPMENT TYPE.....
CONTRACT NO.....
DATE.....
CONTRACTOR.....

- b. Provide a table of contents. Insert tab sheets to identify discrete subjects. Instruction sheets shall be legible and easily understood, with large sheets of drawings folded in. The manual shall be complete in all respects for all equipment, controls, accessories and appurtenances stipulated. Manuals must be applicable to the specific equipment installed and shall include as a minimum the following:
 - (1) System layout showing machinery and controls.
 - (2) Wiring and control diagrams with data to explain detailed operation and

- control of each component.
- (3) A control sequence describing car or hall call assignment, car starting, top speed, slow down, leveling and stopping.
 - (4) Installation instructions.
 - (5) Safety precautions.
 - (6) Adjustment procedure and troubleshooting diagrams, link maps (if applicable) and illustrations.
 - (7) Test procedures.
 - (8) Performance data.
 - (9) Parts list with manufacturer's names and catalog numbers.
 - (10) Maintenance schedules.
 - (11) Service organization with name, address and telephone numbers.
 - (12) Lubricant charts. The chart shall identify lubricants as well as lubrication points and required frequency of application.
 - (13) Provide any supplemental instruction for adjustment and care of the new equipment that may become necessary because of changes, modifications and/or replacement of the equipment or operation under requirements entitled "Guarantees" in the "Construction Contract Clauses".

1.6.3 Wiring Diagrams and Related Drawings:

- a. Wiring Diagrams and Sequence of Operation: Prior to substantial completion of the Contract the Contractor shall submit six (6) copies each of complete "As built" wiring diagrams, schematic diagrams and complete connection diagrams for each elevator showing car wiring, fixture and controller wiring. These diagrams shall show all electrical connections, functions and sequence of operations of all apparatus associated with the installation in the machine, control room, hoistway and remote panels. All symbols shall be listed and named, and all revisions and field changes shall be incorporated therein. Included in the above submission shall be a complete set of revised electrical straight-line diagrams showing electrical and electronic characteristics of all circuits, components and field devices, including printed circuit boards; block diagrams shall not be accepted. Also provide a complete set of Link Maps if applicable.
- b. Contractor shall provide: As a part of the diagrams required to be submitted, schematic diagrams of solid state speed and signal controls which will clearly and adequately present enough informational detail sufficient to allow maintenance personnel to diagnose and identify non-functioning printed circuit boards and other components. Diagrams shall contain all the solid-state logic information necessary for the determination of proper input and output requirements for normal operation within a solid-state circuit board or device.
- c. Required Diagrams: Four (4) of the six (6) required sets of wiring diagrams shall be reproduced at a reduced scale, each set bound in a durable cover, and

the four (4) bound sets, along with one (1) set of standard size diagrams, shall be delivered to the Owner. The sixth (6th) set of standard size diagrams shall be enclosed in 10 mil minimum laminated plastic covers front and back and the entire set bound in a rack and mounted in the elevator machine room at an approved location.

- d. Provide at least two copies of all wiring diagrams (AS BUILT), parts manuals, maintenance manuals and adjustment manuals in electronic PDF format.

1.6.4 Lubrication Chart: Furnish a lubrication chart for each elevator. Mount these charts as directed in the elevator machine rooms. These charts shall identify lubricants as well as lubrication points and the required frequency of application. The Contractor shall identify each type of bearing provided, whether sealed or non-sealed and the frequency of lubrication. Sealed bearings shall not be provided with grease fittings and non sealed bearings shall be provided with grease fittings.

1.6.5 Diagnostic Tool: The Contractor shall provide to the Owner as part of the base elevator contract the full spectrum diagnostic and adjustment tool and related manual that is required to trouble shoot and adjust both the signal and speed control equipment. This tool maybe site sensitive so that it cannot be used on other similar equipment in other properties. This full spectrum diagnostic, adjustment tool and manual shall become the property of the Owner upon contract award. This full spectrum adjustment and diagnostic tool shall be turned over to the Owner as prerequisite for contract award prior to commencement of field installation activities. This full spectrum adjustment and diagnostic tool shall be demonstrated to the Owner as being fully functional on a similar elevator system prior to contract award.

1.6.6 Written Certifications: Required as follows:

1. Contractor shall clearly certify the following:
 - a. Elevators are manufactured and installed in compliance with requirements of this Section and the Contract Documents.
 - b. Elevators and associated equipment noise levels will not exceed NC40 in Lease Spaces.
 - c. Acoustical environment within Lease Spaces shall be free of any pure tone noise due to operation of elevator equipment for this Project. For the purpose of this specification, a pure tone shall be defined as a sound level in any one-third octave band which is greater than 5db above both adjacent one-third octave bands, in the range of 45 to 11,200 Hertz.

1.6.7 Hazardous Materials Notification:

- a. In the event no product or material is available that does not contain asbestos, PCB or other hazardous materials as determined by the Architect/Owner, a

"Material Safety Data Sheet" (MSDS) shall be substituted for that proposed product or material prior to installation.

- b. The existing hoistway landing doors contain asbestos and they shall be removed at the contractors expense from the campus and taken to disposal location that is certified to receive asbestos materials. All efforts in this regard shall be coordinated through Ty Russell at (803) 777-1208.

1.6.8 Asbestos and PCB Certification:

- a. After completion of installation and prior to Substantial Completion, Contractor shall certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated bihenyls (PCB), using format identified in Section 017700/Project Closeout.

1.7 **WORK REQUIRED BY THE ELEVATOR CONTRACTOR**

1.7.1 Legal hoistway and pit enclosure.

- a. Bevel cants (75 degrees from horizontal) over any non opening side wall ledges that project 4" or more into the hoistway. There is a 10" ledge at the top front of the hoistways among other locations that require canting.(Elevator Contractor)
- b. At the 11th floor at the rear of the hoistway cut off the 3/4" bolts that are protruding out 4" into the hoistway. (Elevator Contractor)
- d. Remove concrete re-bar at the rear of the hoistway which protrudes into the hoistways. (Elevator Contractor)
- e. The old elongated protruding hall call push button fixtures shall be removed by the elevator contractor at each floor when new surface mounted push button assemblies are installed. Provide hoistway cut outs for the new key access switch boxes that shall be installed in the front of the hoistway wall adjacent to the hoistway entrance frame at the top and bottom entrance frames with only the ferrule exposed in the upper entrance frame. Switch access shall be gain through the hoistway.(Elevator Contractor).
- g. After the existing long ground floor position/direction indicator fixtures are removed new cuts may be required for the new smaller position/directional indicator fixture boxes. In addition, the long old fixture box cut out will require patching. (Elevator Contractor)
- h. Protect cabs, entrances and special metal finishes from damage after installation.(Elevator Contractor)

- i. Ladders: Extend the current pit ladder side rails from 40" to 48" AFF. (Elevator Contractor)

1.7.2 WORK IDENTIFIED IN OTHER SECTIONS

1.7.2.1 Legal machine room:

- a. Cut and patch machine room walls and floors as necessary by qualified skilled tradesmen. Provide new machine room door 48" wide x 6' 10" high self closing for the future removal of the current geared machines and controllers and the re-installation of new gearless machines and controllers. Machine removal and replacement shall be performed with a crane whereby the old machines and controllers shall be removed and new machines and controllers installed. Note: The new Imperial Gearless Machine Model 525 is delivered with shipping dimensions of 36" x 36" x 37" and weighs 3,350 lbs. + deflector sheave 20" and base of 1,600 lbs. equals 4,950 lbs. The deflector sheave maybe mounted either in the hoistway or elevated in the machine room. The bedplate of the machine can be adjusted to span the existing machine beams to further distribute the load. The existing 22 CT Otis Machine weighs 2,400 lbs + drive motor 325 lbs. equals 2,725 lbs.
- b. After the removal of the old machines and controllers and the re-installation of the new controllers and machines formal entry steps and platform with hand railings shall be installed to serve the new side wall entry door for an ongoing dedicated elevator machine room access.
- e. Provide a Class "ABC" fire extinguisher with mounting bracket in machine room adjacent to the machine room access door.

1.7.2.2 Electrical services:

- a. Lighting for machine room (19 fc) and elevator pits (10 fc). Provide lighting and related switch for elevator machine room and elevator pits (Fluorescent lighting with T-8 fixtures with duplex tubes is recommended for code compliance) in the elevator pit.)
- b. Provide three (3) tube T-8 lighting fixtures in each elevator pit to provide the code required 10 FC lighting levels at the pit floor level as shown on the electrical drawings.
- c. GFI convenience duplex outlets: NFPA 70, provide convenience duplex ground fault protective outlet for each elevator in the machine room and in each

elevator pit.

- d. Provide three phase main line power feeders to terminals of each new elevator controller unit, including protected fused, lockable in the "OFF" position only disconnect switch (copper conductors to terminals required).
- e. Automatic transfer switch to connect all cars to a source of standby (emergency) power. Provide adequate emergency power to run the designated emergency power elevators.
- f. Provide separate emergency power signal to each elevator or elevator group. This signal shall notify the elevator signal system that emergency power is being provided. This signal shall be a normally open dry contact on the ATS which will close under emergency power conditions.
- g. Provide a normally open dry contact to the elevator bank which will close over an adjustable time period of from 5 to 29 seconds in advance of normal power restoration or during emergency power testing transfer. This contact closure shall notify the elevator signal system that normal power or emergency power transfer testing will take place in a defined time period, which will allow the emergency power or normal power car(s) time to stop at their nearest floor to await normal or emergency power transfer.
- h. Provide in-phase monitor to verify that the standby or emergency power is in-phase with normal power when a transfer back to normal power takes place. This in-phase monitor shall also provide in-phase monitoring during both normal/emergency and emergency/normal power during testing.
- i. Currently there is only one (1) 120 VAC 15 amp disconnect for each car. Provide a second 120 VAC 15 amp disconnect for each elevator. One circuit shall provide car lighting and exhaust blower and one circuit for plug receptacles, work lights and other devices. The car lighting and exhaust blower circuit shall be automatically powered under emergency power conditions.
- j. Provide a 120 Volt three phase 30 amp AC power source for elevator signals (if required). These feeders shall be automatically powered under emergency power conditions. Run wires and conduit to a location as indicated by the elevator contractor.
- k. Install fire alarm initiating devices or reuse existing in each elevator lobby, machine room and hoistway if provided only to initiate Emergency Recall Operation to the primary "Designated" fire or "Alternate" fire floor. The Ground floor shall be the "Designated" fire floor and the second floor shall be the "Alternate" fire floor. The activation of a fire initiation device at any floor above the Designated fire floor or in the machine room or in the hoistway if provided shall return the cars non-stop to the Designated level. The activation of a fire

alarm initiating device at the Designated Level shall run the car non-stop to the Alternate level. In addition to the above provide an output signal to indicate the activation of a fire alarm initiating device has been activated in either the machine room or in the hoistway (if provided). Be advised that only alarm initiating devices in the elevator lobbies, hoistway and machine room shall automatically capture the elevators into Phase I firefighters' mode of operation. No other fire alarm initiating device in the building or manually operated pull stations in the building shall capture the elevators into phase I operation. Run alarm initiating device wires and other signal wires in conduit to group or individual car controllers.

- l. Temporary power of permanent characteristics as required by elevator Contractor shall be provided to install, test and adjust the elevator equipment.
- m. Electric power during erection, for illumination, operation of tools, and shafters.
- n. Provide one (1) 2" electrical conduit from the vertical duct riser in the elevator hoistway to the remote the Fire Command Center behind the main lobby information desk. The elevator contractor shall pull and supply the wiring required and make connections. The electrical contractor shall provide the conduit run with a pull wire as required.
- o. A TV camera shall be mounted in each elevator cab. Each TV Camera shall use an RG 6 coaxial traveling cable with a 20 gauge minimum conductor. If in fact the security contractor requires TV Cameras with Cat connectors then the security shall provide a conversion box in the machine room and one on the car top.
- p. Provide a proximity card reader in the hall call push button fixture in the left push button riser at the ground floor between cars 1 and 2. This proximity card reader shall be located behind a blacken glass flush mounted in the push button assembly.
- q. Provide a 1-1/2" thin wall conduit from security communications room 100 A at the ground floor to a junction box located above the suspended ceiling in front of the elevator entrances at the ground floor. Provide a 1-1/2" conduit from the telephone communications room 100 B at the ground floor to this same junction box. Provide a 2" thin wall conduit from the fire command center panel located behind the information desk at the ground floor to this same junction box. This common junction box shall be mounted in the vicinity opposite the vertical duct riser in the hoistway. A 2" thin wall conduit shall be run from this ground floor junction box to the narrow side of the vertical duct riser in the elevator hoistway which will require wall penetration.
- r. Provide a new dedicated telephone line to each elevator controller in the elevator machine room. It is permissible to use the vertical elevator duct riser in

the elevator hoistway to run these phone lines.

1.8 **SITE CONDITION INSPECTION**

1.8.1 Prior to beginning the installation of equipment, examine the hoistway and machine room architectural drawings and existing structural conditions to verify that no dimensional or other irregularities exist that would affect the execution of the work as specified. Particularly, note:

- a. Hoistway dimensions including pit depth, overhead clearances, hoistway plumbness and length of travel.
- b. Sill supports and pockets.
- c. Support foundations for the new machine and deflector sheave to interface with the existing machine beams.

1.8.2 Do not proceed with installation until "work identified in other sections" conforms to project requirements.

1.9 **ERRORS AND OMISSIONS**

1.9.1 In order to discover and resolve any conflicts or lack of definition which might create construction problems, the elevator bidder shall submit a written report to the Architect/Owner at least ten (10) days prior to the bid due date for the work covered by this section. This report shall include the following statement:

1.9.2 "We have examined the drawings and specifications for the work required in the elevator contract and for the related work identified in other sections". Except for the items described in the attached listing we have discovered no errors, omissions, impractical details or conflicts between our proposed work and that of other trades or conditions which would require deviations from the drawings and specification."

- a. Certify the adequacy of the proposed electrical power supplies indicated on the electrical drawings. Submit a "Power confirmation" standard form to the Owner for verification of the power characteristics required for the new equipment.
- b. List items for which clarification is necessary. If none, so state.

1.10 **WORKMANSHIP, MATERIALS AND PROTECTION**

1.10.1 All work under this section shall be installed in a first class, neat and workmanlike

manner by mechanics experienced in the trade involved. All materials and equipment shall be new, without imperfections, flaws or defects.

1.10.2 The Contractor shall properly protect all work to prevent damage. All conduit openings shall be closed with caps or plugs during the installation. All equipment shall be tightly covered with approved plastic material and protected against dirt, water or mechanical damage. At final completion, all work shall be thoroughly cleaned and delivered in perfect, unblemished condition.

1.10.3 All damage to the building or its mechanical and electrical system resulting from the Contractor's failure to adequately protect the work shall be repaired, or replaced as directed, at no additional cost to the Owner.

1.11 **INTERCHANGEABILITY**

1.11.1 The equipment, apparatus, devices and appurtenances of the elevators shall have all parts which perform the same function manufactured to one design for each part, and each part shall be interchangeable with other like parts.

1.12 **TRADEMARKS**

1.12.1 No trademarks, nameplates or other identifying symbols visible to the public shall appear on any piece of equipment.

1.13 **GENERAL REQUIREMENTS**

1.13.1 ASME A17.1 2010 unless otherwise indicated or specified. The completed elevator installation, including equipment, material, workmanship, design and tests, shall be in accordance with the standards, rules and regulations referenced herein. Parts and equipment subject to wear shall be designed and constructed for complete interchangeability among like units provided by this Contract. Working parts shall be accessible for inspection, servicing and repair. Provide adequate means for the lubrication of wearing parts that require lubrication. Maintain all elevator equipment in an orderly and clean manner during and after construction prior to acceptance.

1.13.2 Elevator Description: This specification includes the modernization of three (3) geared elevators and their replacement with three (3) gearless elevators. These elevators shall be either variable voltage DC with SCR drives or VVVF with flux vector control. Elevator car and hoistway doors shall be automatically powered by new MOVFR Door Operators. The approved elevator systems are the Otis Elevonic 411, Schindler Model TXR5 7000, KONE Model KCM and MCE 4000. The GAL Galaxy is not approved for this project.

1.13.3 Gearless Traction Elevator Description:

A. Passenger Traction Gearless Elevators: 1 - 3

1. Type: Conventional Traction Gearless
2. Number of cars: 3
3. Capacity: 2,000 lbs
4. Speed: 350 fpm
5. Counterbalance: Precisely 42.5%
6. Starts Per Hour Capability: 240
7. Drive Capability: 250% FLRC
8. Minimum HP: 15 (Imperial Model 525)
9. Type loading: Class A
10. Length of Travel: 132' 8" (Verify)

Note: Elevator Contractor shall verify the travel distance with field measurements.
11. Number of Stops: 12
12. Number of Openings: 12 Front Only B - 11
13. Current Inside Car Conditions:

Width: 5' 11" Side wall to side wall (assume total wall thickness 2" on each side including steel shell)
Depth: 3' 7" Rear wall to front return (assume rear wall thickness 2")
14. Current Platform Outside:

Width: 6' 3" (assume 2" wall thickness on each side)

Depth: 4' 2" 7/16" (assume 2" rear wall thickness + return panel thickness 2-7/8" + car sill 4-5/16")

15. Current Overhead Dimension Available: 7' 2" (Top of car crosshead to the underside of current hoistway machine beams.) Current roller guides are 10-1/2" high above the car top crosshead (Elevator Contractor to verify these overhead dimensions with field measurements). Also see attached original elevator contractor's original layout drawing as a reference guide only. Be advised the new side style length which will allow for new 10' 0" cabs will proportionately reduce the above current overhead dimension. Unless the resultant new overhead dimensions preclude the installation of the new Imperial gearless machine deflector sheave under the slab attach new deflector sheave to the existing underslab machine beams.
16. Pit Depth Available: 5' 0"
17. Cab shell: Provide new 14 gauge sheet steel walls with 12 gauge canopy with a hinged emergency exit with a non re-setting electrical contact.
18. Platform: Retain existing unless the plywood is damaged where replacement 3/4" marine grade plywood shall be substituted. Provide a single piece 12 gauge sheet steel on top of the current or new plywood flooring with counter sunk flat head wood screws at 12" centers.
19. Cab Finishes: Provide new cab interior with six (6) LED down light suspended ceiling, hang on plastic laminate panels with stainless steel accent bars between panels, with 6" high stainless steel center band and base with porcelain tile flooring (See architectural drawings).
20. Cab Height from Floor to Canopy: 10' 0" (New)
21. Door Opening Size: 3' 0" x 7' 0"
Front Only
22. Door Opening Type: Single Speed Center Opening
23. Landing Entrances and Doors: Re-finish and re-paint the existing bull nose entrance frames and the new landing door panels that shall be provided in prime paint at all levels (By others)
24. Operation:

- (a) Automatic - 3 car group (1-3) selective collective with zoning /
Two (2) button riser serving floors B - 11.
 - (b) Provide new concealed riser in car 1 entrance frame.
 - (b) Selective collective triplex operation
 - (c) Independent operation
 - (d) Inspection operation
 - (e) Key Access (Top and bottom floor)
 - (f) Emergency Recall Operation
 - (g) Main and Alternate fire floors
 - (h) Ground floor Security
 - (l) Restricted Floor Access
 - (j) Cars Out of Service
 - (k) Emergency Power Operation
 - (l) Main lobby card reader only to allow car interior
access.
 - (m) 3 D Door Protection
- 25 Roped: Overhead 1:1 Provide Imperial Model 525 gearless
machine with deflector sheave and (6)
5/8" x 19 Seale regular lay hoist ropes.
26. Compensation Chains: Provide new tandem Whisperflex chain
compensation equal to the weight per foot of the existing
compensation chains. Also provide ties down idler sheaves in the pit
for these new tandem Whisperflex chains.
27. Safeties: Totally disassemble, wire brush to remove any
corrosion, adjust, lubricate and re-assembly.
28. Car Sling Side Styles: Replace the existing 8' cab side styles with
new 10' cab structural steel side styles of the
same cross sectional modules as existing
and retain and reuse the existing safety
plank and crosshead.
29. Seismic Zone: 2 or greater 3 (Provide seismic zone
requirements per ASME A17.1)
- 1.13.4 Performance: The elevators shall be adjusted to conform to the following basic
performance standards:
- a. Speed: Full load "Up" shall not be less than the rated speed. Full load "Down"
shall be no more than 103% of rated speed. No load "Up" or "Down" shall be
within 3% of the rated speed.

- b. Capacity: With 125% capacity load in car, run car down from top terminal floor to any floor including bottom terminal and demonstrate that the car can stop within the leveling zone and open its doors without the need to re-level.
- c. Door Operation, Opening and Closing: For all elevators, leveling accuracy shall be less than 1/8" under all loading conditions regardless of direction of travel without hunting. Provide self-leveling or re-leveling device. Self-leveling or re-leveling device shall, within its zone be entirely automatic and independent of the normal operating device and shall correct for over travel, under travel and rope stretch.
- d. Doors shall start to open while the elevator is leveling and shall be three-quarters open when car sill is level with the landing sill with the brake set. Pre-door opening during the leveling process shall be required.
- e. Starting and stopping shall be smooth, without perceptible steps of acceleration or deceleration.
- f. Stopping upon operation of the in car "KEYED STOP" switch shall be rapid but not violent. Controlled emergency stopping where brake delay is realized shall not be accepted. All power shall be removed from the driving machine motor and brake immediately upon stop switch operation.
- g. Door operation shall be quiet and smooth and shall not result in cab movement during the door cycling process. Door cycle times shall be adjusted as follows:

Cars 1 - 3

Opening Width:	36" (1 Speed - Center Opening
Open Time:	1.5 seconds
Close Time:	2.1 seconds

- h. Provide a car call dwell timer with an adjustable range of from 1.0 second to 10.0 seconds. Initially set the timer at 3.0 seconds. The control circuitry shall be such that with the breakage of the car door protective field during door opening and full open position and or a pulsation of the door close push button and or with a pulsation on a registered car call push button that the car call dwell time shall be reduced over an adjustable range from 3/4 to 1-1/4 seconds.
- i. Provide a hall call dwell timer with an adjustable range of from 2.0 seconds to 10.0 seconds. Initially set the timer at 4.0 seconds. The control circuitry shall be such that with the breakage of the car door protective field during door opening and full open position and or with a pulsation on a the door close push button and or with a pulsation on a registered car call button push button the hall call

dwelt time shall be reduced over an adjustable range from 3/4 seconds to 3.0 seconds.

- j. Provide a car call, hall call coincidence circuit whereby in the event that an elevator is responding to the same car call and directional hall call demand, that the hall call dwell time will have precedence. In the event of this coincidence condition the breakage of the door protection field or a pulsation on either the door close or car call push button shall not reduce the established hall call dwell time.
- k. Provide a 4 second minimum advanced audible and visible hall lantern signal at all floors in response to a registered hall call prior to the opening of the car and landing doors. Provide signal logic whereby the ground floor directional indicator can be turned off for car calls only with a keyboard entry. Also provide signal logic whereby the advanced hall lantern signal at the main lobby only can be delayed with a keyboard entry until passenger unloading is complete during up peak time periods.
- l. Provide a "brake to brake" or "car start to car stop time" or "start of drive sheave rotation to stop of drive sheave rotation" for a 12' 0" floor that shall not to exceed:
 - 1. 4.8 - 5.1 seconds (Gearless)
- m. Provide a car start dwell time of 0 to 0.20 seconds maximum for all cars. Car start dwell time is defined as the time period commencing after the car electrical gate switch contact and the landing door electrical interlock contact are closed with the landing doors mechanically locked and the car of movement in response to a hall or car call demand.
- n. Provide a Performance between 8.00 - 8.8 seconds. Performance time shall be measured from the time the doors start to close at one floor until the car doors are 3/4 open at an adjacent floor with the car leveled within 1/8". The performance times shall be maintained without "hunting" at the floor levels. The elevator shall maintain approximately level at the landing, irrespective of load while loading and unloading.
- o. Provide a car door nudging time of 35 seconds. The car door nudging time shall be measured from the time when the car door protective field is broken after the car doors have fully opened in response to a car call until the car doors commence to close at a reduced speed with the initiation of a nudging buzzer.
- p. Door Force: Provide a door closing force that shall not exceed 30 lbf. This force shall be measured on the leading edge of the door with the door at any point between one third and two thirds of its travel.

- q. Provide a signal system design that shall not allow car calls to be registered behind the direction of car travel.
- r. Provide a door control system whereby a forced closed or nudging door mode of operation will not result if the door protection field is not broken during repeated car or hall call stops without passenger transfer or protective field breakage.
- t. Prior to termination of the contract included maintenance period the elevators shall be re-adjusted, as required, to achieve a brake to brake (car start to car stop) time for one floor runs using a 12' 0" reference as related above.

1.13.5 Provide Warranty Maintenance for the Elevators: Commence the contract included maintenance period following the completion of the entire installation including correction of all deficiencies on every car. This twelve (12) month contract included maintenance period shall require the same performance parameters as related below for the five (5) or ten (10) year negotiated maintenance agreement between the Owner/Property Management and the Maintenance Contractor which includes the following: Work activities shall be performed during normal working hours (7:00 AM to 6:00 PM) M-F excluding holidays, however, twenty-four hour emergency callback service shall be provided as necessary whereby the premium portion of any overtime "call backs" required shall be paid by the owner. The maintenance service shall include a minimum of 12 mechanic hours of preventative maintenance only per month excluding "Call Backs", "Service Work" and "Vandalism". Maintenance shall only be performed by competent and trained maintenance personnel. This maintenance shall include the necessary speed and signal control adjustments, lubrication, cleaning and parts replacement as necessary to maintain equipment calibration and performance in an as new condition over the term of the maintenance contract. The warranty period on all equipment shall be one-year minimum. The first year of the maintenance contract shall reflect a credit for the one year Warranty period which would be included in the base building elevator contract. The Contractor shall submit both a five (5) and ten (10) year full maintenance proposal with their new construction bid which may or may not be accepted by the Owner following the expiration of the one (1) year contract included maintenance.

1.13.6 The maintenance proposal selected shall commence immediately following the completion of the new construction installation. Individual cars may be pro-rated to realize a single total start date for the commencement of the five (5) or ten (10) year maintenance agreement. The Owners Standard Maintenance Agreement shall be the document utilized for this continuing maintenance agreement. This document shall include, but shall not be limited to the following requirements:

- a. Preventive maintenance procedures shall be performed in accordance with Contractor's check chart, supplemental maintenance requirements as identified in the Owners standard maintenance agreement and ASME A17.1 2010. The

minimum monthly preventive maintenance hours per unit shall be four (4) hours excluding callbacks, repairs, service work and other services. Payment of monthly maintenance invoices shall be paid in accordance with the following formula:

Preventative Maintenance Hours expended that month / Preventative Maintenance Hours required that month X Monthly Invoice Amount = Percentage of monthly payment paid.

Note: The above (Monthly Payment) multiplier may not exceed 1.

The above relationship maybe averaged over any three (3) consecutive monthly time periods including that billing month.

- b. The Contractor maintenance personnel shall sign in and out on the Owners Elevator Maintenance Activity Log Sheet (Attachment # 1) for each on site visit. The maintenance mechanic shall briefly describe the work activity performed and identify the personnel involved.
- c. A log pertaining to all maintenance activities as specified in ASME A17.1 2010 shall be maintained on site in the machine room at all times by the maintenance contractor. The log shall contain, as a minimum but not limited to a detailed record of all tests, inspections, and other maintenance duties referred to in this section that have been performed in the previous five years. For records keep in an electronic format, a hard copy shall be placed in the job site log within a maximum of three (3) months of the initial recording.
- d. Testing of Elevator systems shall be performed at frequencies as outlined in ASME A17.1 2010 and other testing as required by the Authority Having Jurisdiction (AHJ). The document frequencies in these code standards shall be the minimum frequency for testing.
- e. Normal working hours shall be 7:00 a.m. to 6:00 p.m. Monday through Friday excluding holidays.
- f. Special Operations: Emergency Power and Firefighters' Operation shall be checked at a frequency as identified in accordance with ASME A17.1 2010 and other local code requirements. A written certification of successful operation shall be delivered to the Owner after each test performed, in addition a record of all such tests shall be posted in the machine room log books for each elevator. Firefighters' service shall be tested once per month by the elevator maintenance contractor and the results entered into the machine room Firefighters' Service log. On line entry of the results of the testing maybe performed, however, a hard copy of the results must also be entered into a machine room Firefighters' Service Log.
- g. An emergency callback is defined as the need to correct a "shutdown" or

"malfunction" by adjustments or minor parts replacement.

- h. The bidder shall provide the below listed billing rates with the bid document submission. These billing rates are subject to annual material and labor adjustments as outlined elsewhere in this Agreement:

Rate	Monday - Friday 7:00 AM to 6:00 PM	Time X 1.7 Monday thru Saturday (Premium Time Only)	Time X 2 Sunday and Holiday (Premium Time Only)
Adjustor			
Mechanic			
Helper			
Team			

- i. Owner reserves the right to terminate this maintenance Agreement with thirty (30) days written notice for the following:

1. Sale of property.
2. Failure of Contractor to maintain the equipment in accordance with design standards and the installation contract requirements. This shall apply only after the Contractor has been given written notice of the deficiencies and has been allowed an initial thirty (30) day time period to make corrections.
3. Elevators are removed from service.
4. Performance: If the elevator performance parameters are not maintained in accordance with installation project requirements as specified herein.
5. Operational Level: The elevator Contractor warrants that the elevators shall be maintained at an operational level of 98% as determined by the following formula:

$$\frac{\text{Total Available Time All Units} - \text{Down Time all Units}}{\text{Total Available Time All Units}} \times 100 = \text{Operational Level}$$

Total available time for all cars - during normal business hours of 7:00 A.M. to 6:00 A.M.

Downtime all units - The time in which elevators are out of service based upon equipment mal-functions or unsafe operating conditions. This includes time periods where the elevators are being serviced by the maintenance contractor to correct mal-functions.

Time out of service for maintenance, scheduled maintenance repairs or other services are not included as downtime.

- j. Spare Parts: Provide spare parts required for maintaining these elevators. These spare parts shall be placed in gray steel maintenance cabinet Grainger Model 1W814 which shall be provided by the elevator contractor in the machine room, with doors equipped with a lock and two keys. Also provide OSHA waste can Grainger 4T080. These spare parts and the cabinet shall become the property of the Owner and shall be left on site if maintenance contract is terminated. Immediate spare part replacement shall take place when stocked on site spare parts are used. Place the maintenance cabinet in the machine room at a location as approved by the Owner. The minimum spare parts are as follows:
1. A complete set or box of fuses for all types used.
 2. One contactor assembly for each type used.
 3. Spare relay or switch for each type used.
 4. A complete set of brushes for the D.C. machine if provided.
 5. One door operator motor for each type used.
 6. Hanger sheaves for car and hoistway doors, one of each type.
 7. Two complete door interlocks and car gate switches.
 8. A complete door protection unit assembly for each type used.
 9. A complete set of spare solid-state printed circuit boards for each type used.
- k. Base continuing 5 and 10 year maintenance proposals on labor rates (80%) and material indices (20%) in effect at the time of bidding. List indices and related date with maintenance bid proposals.
- l. The Owner, may at their discretion, exercise the option of accepting one of the maintenance proposals at any time prior to the completion of the new installation contract. There shall be no linkage between the base building elevator contract award amount and the acceptance of either a 5 and 10 year

continuing maintenance proposal.

- m. Prior to the completion of the contract included 12 month maintenance period all code required Category testing shall be performed and log entries made in the machine room log books.

1.13.7

The bidder shall provide the below listed maintenance billing rates with the modernization bid document submission. The modernization billing rates are for work activities not identified in the "scope of work". These billing rates are subject to annual material and labor adjustments as outlined elsewhere in this Agreement:

Rate	Monday - Friday 7:00 AM to 6:00 PM	Time X 1.7 Monday thru Saturday	Time X 2 Sunday and Holiday
Adjustor			
Mechanic			
Helper			
Team			

1.14

POWER SUPPLY

1.14.1

The electric service available at the elevator controller will be 208 Volt, 3 phase, 60 cycle alternating current. Before manufacture of the equipment, the exact power requirements for each elevator shall be calculated and submitted to the Architect for approval. This power confirmation shall include but shall not be limited to the following: 1) Full Load Up Running Current (FLRC) with constant contract velocity 2) Full Load Up Acceleration Current (FLAC) - Provide drives with 250% capability of the FLRC 3) The maximum amount of regenerative power (Full load down) realized with each unit during emergency power conditions 4) Maximum BTU heat output of each elevator based upon 240 starts per hour. This power confirmation data sheet shall also state whether or not an in phase monitor is required during the time periods of power transfer. The Contractor shall also submit a standard "Power Confirmation" request to the Owner and shall not proceed with fabrication of equipment until the Contractor receives a return confirmation.

1.15

POWER CHARACTERISTICS AND HEAT RELEASE REQUIREMENTS

1.15.1

Design equipment to regenerate overhauling power back into building power supply

both during normal and emergency power conditions. Do not provide regenerative power heat dissipation grid resistors in the machine room (which require additional machine room cooling). Provide regenerative drives for all elevators.

1.16 **ARRANGEMENT OF EQUIPMENT**

1.16.1 Code conforming working space dimensions with regard to electrical equipment shall comply with NFPA 70 the National Electric Code (NEC), unless otherwise approved by the local inspecting authority.

1.16.2 Equipment in the machine room shall be so arranged that rotating elements including sheaves can be removed for repairs or replacement, either by trolley beams, dolly, trap door or other conventional means, without dismantling or removing other equipment and elevator components in the machine room. Equipment shall not be installed so that interfere with equipment access and trap doors.

PART 2 PRODUCTS

2.1 **CHARACTERISTICS OF EQUIPMENT AND OPERATION**

2.1.1 The elevator components used, including driving machine, motors and control panels shall be the product of one manufacturer of established reputation, except that components may be the product either wholly or in part, of another manufacturer of established reputation provided that such items are properly engineered and produced so that the final product will meet the engineering design parameters of this modernization specifications. The machinery and equipment proposed shall operate with a minimum of noise. The Contractor shall provide the name of the buildings where the same elevator equipment has been successfully installed and manufactured by the same manufacturer of the elevator equipment whose product he proposes to provide. The Contractor shall arrange an inspection of similar equipment for the approval of the Architect/Owner if requested. The elevator installation submitted for inspection shall be equivalent to those specified herein. The Owner reserves the right to reject equipment and which are in his opinion is not sufficiently quiet under all operating conditions or that does not to meet the technical requirements of the specifications. The systems which are pre-approved subject to engineering requirements of this project are as follows: Otis Elevonic 411, Schindler Miconic TXR5 7000, KONE KCM, Tyson TAC 50 and MCE 4000 with non tape landing system. *GAL Galaxy is not approved for this project.*

2.1.2 The Contractor shall submit to the Owner for approval within 30 calendar days after contract award, samples in quintuplicate of all finishes specified for the car enclosure which shall include but shall not limited to ceiling, return panels, header, car stations, hang on panels, landing fixtures and other items as appropriate or specified elsewhere.

2.1.3 The Contractor shall submit to the Owner for approval within calendar 30 days after contract award information sufficient to verify full compliance with contract requirements

on the proposed items. Such information shall include, as required: Manufacturer's Name, Trade Names, Model or Catalog Number, Nameplate Data, and corresponding project specification number and paragraph.

- 2.1.4 The contractor shall provide within 30 calendar days after contract award 6" to 8" square sample material of car interior hang on panels and car doors stainless steel finish.
- 2.1.5 The elevator contractor shall have both installed and maintained elevator equipment for a period of not less than 4 years and have an office located within 20 miles from the site and have performed modernizations on not less than two (2) modernizations, which have been in successful operation for a period of not less than two (2) years under conditions of residential building usage.
- 2.1.6 Owner reserves the right to review a building at random where a potential bidder is currently providing full contract maintenance. If in the opinion of the owner or his agent it is found that this potential bidder is not performing in accordance with the parameters of a full maintenance contract, then this potential bidder will not be considered as a responsive bidder.

2.2 **CAR OPERATION AND CONTROL**

- 2.2.1 **Key Switches and Alarm Buttons:** Provide keyed operated stop switch in the in car access panel in each elevator. Provide an alarm push button in all car-operating panels for all cars. Operation of the stop switches shall remove power from the driving machine motor and brake and stop the elevator independently of the regular operating device. The emergency alarm buttons shall be connected to an alarm bell and electrically parallel with the car call push button device to also serve as a redundant emergency car call signal.
- a. **Alarm Button:** Double contact type. One contact shall operate an A.C. bell served by the normal A.C. power supply. The other contact shall operate a different bell powered from the car emergency lighting power supply. Both bells shall be 6" in diameter. A single D.C. alarm bell can be used providing it is D.C. operated and wired in conjunction with an on-car D.C. battery charging circuit from normal/emergency 110 VAC power.
 - b. **Alarm Bell Location:** Locate the alarm bell, including conduit and wiring on the car top of each elevator and at the main lobby for cars that have a travel over 100'.
 - c. Provide two (2) terminals on each controller that will provide an alarm signal in the event an alarm bell push button is pushed or activated. This signal shall represent the closing of a normally open dry contact. An alarm bell activation in the car only without an external controller signal shall not be accepted.
 - d. **Keys:** Provide all elevator key switches of the EX Series. 2.10

- e. Voice Annunciator: Provide female voice annunciator with adjustable volume in each elevator that will announce floor and direction of travel as soon as door opens.
- 2.2.2 Hoistway Access Switch: Provide key-operated hoistway access switches that shall permit limited movement of the car, both at the lowest terminal floor served and also at the top floor terminal floor served (or as approved by the local inspecting authority) for hoistway key inspection access. These switches shall be operative only when the inspection switch in the car operating panel is in the "INSPECTION" position. For all elevators, these switches shall be located 6' above finished floor. Provide stainless steel key access cylinder switches with only the ferule exposed in the door frames (submit drawing for approval). The bottom key access switch shall limit upward travel so that the car bottom is level with entrance header. The top floor key access shall limit car travel downward until car crosshead is level with top or upper floor landing sill.
- 2.2.3 Top of Car Operating Device: Provide the elevators with the manufacturer's standard operating devices, mounted on or from the car crosshead for purposes of adjustment, maintenance and repair. This control shall consist of buttons listed "UP", "DOWN", "SAFETY", "EMERGENCY STOP SWITCH" (red in color) and an "INSPECTION SWITCH". The Inspection Transfer switch on the top of car operating device shall disconnect the hoistway access switches and render the top of car operating device operative. Also provide both door open and door close constant pressure push buttons within the inspection station. Operating buttons and control handles shall be shrouded or otherwise protected to preclude accidental movement. Emergency Operation, alarm buzzer and indicator light marked fire service shall be provided in the top of car inspection box to notify the top of car inspection operator that Emergency Operation Recall has been activated. Provide a car top ground fault duplex receptacles.
- 2.2.4 Automatic Emergency Recall Operation:
- A. General: Provide Emergency Operation for automatic elevators to operate as per ASME A17.1 2010.
 - B. Emergency "FIRE RECALL" Operation:
 - 1. Provide a Phase I three (3) position first floor (ground) "FIRE RECALL" Emergency Operation Recall key switch marked "RESET", "OFF" and "ON" at the ground floor. Provide an additional key operated "FIRE RECALL" two (2) position Phase I key switch marked "OFF" and "ON" at the Fire Command Center for the elevator group. Ground level shall be the primary fire service floor. The alternate fire service floor shall be level 2. The actual floors designated for both primary and alternate fire floors for all elevators shall be confirmed with the local Fire Marshall. The Ground level shall have the primary fire floor key switch and related indicator light incorporated within the hall call push button cover

plate. Provide a two (2) position switch at the fire command center for both the primary and alternate fire floors.

Emergency "Manual" Recall Operation: Manual recall shall be initiated from a three or two position key switch located at the Primary or at the Fire Command Center. These switches shall be key operated and marked "RESET", "OFF" and "ON" and "OFF" and "ON" respectively. The Manual Recall firefighters' key shall be keyed per code.

- a. Recall Operation Key Switches: The "RESET", "OFF", and "ON" positions and "ON" and "OFF" positions shall be permanently identified. Separate red pilot lights shall illuminate when a switch is in the "ON" position.
2. Automatic Emergency Recall Operation: Connect the elevator lobby smoke detection system conforming to the applicable requirements of the latest requirements of ASME A17.1 2010 to the signal system. The activation of a detector at any floor (other than the primary fire floor), in the machine room or hoistway shall cause all elevators to return nonstop to the designated primary fire floor. However, activation of a detector device at the designated primary fire floor shall cause the cars to travel to the Alternate fire floor.
- a. The designate primary fire floor shall be:

First (ground) floor for all cars.
 - b. The Alternate fire floor shall be:
2nd floor for all cars.
 - c. When Manual or Automatic Mode ("ON" position), each car shall return to the Primary Fire Floor or Alternate Fire Floor, and remain out-of-service with doors opened unless placed on In-Car Emergency Operation or returned to Normal Service. The procedure for returning the elevators to the Designated or Alternate Fire Floor shall comply with ASME A17.1 2010.
 - d. Provide an illuminated visual and audible signal, located on the main car operating panel, to alert passengers that the car is in the Emergency Operation Mode. Conform to the requirements of ASME A17.1 2010.
 - e. When the Recall Switches are placed in the "Off" position, each elevator shall operate normally despite any signals received for automatic recall operation.

- C. Phase II Emergency In-Car Operation:
 - 1. Each elevator shall be arranged for Phase II In-Car Operation.
 - 2. Provide a three-position key operated In-Car Emergency Service Switch with "OFF", "HOLD" and "ON" markings mounted flush, along with a visual signal, on the upper portion of the main car operating panel of each elevator in a panel related by code. The "ON" and "HOLD" operations of the switch shall be activated by the emergency operation key switch, and shall be permanently identified. The In-Car Emergency Service Switch shall operate as outlined in ASME A17.1 2010 under Emergency Recall Operation Mode.
- D. Co-ordinate the elevator control equipment with the Elevator Smoke Detector System (if applicable) for Automatic Elevator Recall to assure a complete operable automatic recall system.
- E. Drawings and control circuit diagrams shall be submitted for approval.
- F. Elevator Control Panel: Provide stainless steel elevator control panel in Fire Control Room. Incorporate the following features into control panel for each elevator.
 - 1. Digital position indicators and direction arrows for each elevator. Position indicators shall be at least 1 ¼ inches high.
 - 2. Two position Phase 1 key switches for each group of elevators.
 - 3. Interlocked push buttons or key switch for each group of elevators so that only one elevator per group can be re-selected to operate off of emergency power.
 - 4. Up and down direction arrows.
 - 5. Phase 1 indicator lights.
 - 6. Phase 2 indicator lights.
 - 7. Emergency power light for each group of elevators.

2.2.5 Group Automatic Car Operation: Make provision for a supervisory control system, including automatic dispatching, whereby selected car, at designated dispatching points, automatically close their doors and proceed on their trips in a regulated manner.

- a. The passenger elevator group shall be served by two (2) normal hall call push

button risers. One (1) push button riser shall replace the existing button riser between cars 2 and 3. The new push button riser shall be installed between cars 1 and 2 and this riser shall have a proximity card reader incorporated with the cover plate. The activation of this car reader shall allow the registration of an up or down hall call to gain access to the car interiors on either the normal hall call push buttons or the concealed riser push buttons. The activation of this proximity card reader shall allow the registration of a hall call with an adjustable time period from 5 to 30 seconds.

- b. A new concealed push button riser shall be installed in the right hand side of the existing entrance frame on car number 1. These concealed riser push buttons shall only become active after the car reader in the adjacent hall call push button fixture has been swiped with a security card. This concealed riser shall call only elevator 1.
- b. Provide main and auxiliary inset car stations in the return panels.
- c. Pressure on a car call or landing push button shall call or dispatch a car to that desired landing when the interlock and car gate circuits are closed.
- d. Provide an adjustable time limit (Car call dwell time and Hall call dwell time) to hold a car at a landing where it has stopped for either a car or hall call as specified.
- e. Operation of the "KEYED STOP SWITCH" shall not interfere with registered car or hall calls. After the switch is released, the car shall resume normal group operation.
- f. Provide a new Pana 40 Plus 3 D door protection unit for each car with a solid state signal output or an approved equal. Nudging with reduced door pressure must be provided as part of the controller design along with the related nudging buzzer. During the door opening cycle the breakage of the door protective field shall result in the reduction of the car or hall call dwell times as specified.
- g. Provide an adjustable load weighing device (3 load cells) incorporated within the car top cable hitch plate. These load weighing devices shall have at least 3 output signals that represent different loads in the car. Replace all the existing the rubber platform isolation pads with new on all cars. The use of Nylube or K-Tech load weighing crosshead mounted strain gauges is prohibited. Multiple output load range signals are required to perform various signal functions. Design system to bypass registered landing calls when the car is loaded over an adjustable range from 60% to 80% of its rated capacity load independent of the weight of the hoisting ropes, traveling cables, and cab. The device shall not prevent operation if the car is loaded beyond the preset load value and not above capacity load. The device shall operate to automatically bypass hall calls until enough passengers or load leaves the loaded car to reduce the load below the preset value. Bypassed hall calls shall remain registered until they are

answered. If the device detects an over capacity load, the car shall not start and the brake shall not pick. During this over capacity load condition an audible and visual signal in the car shall remain active until the over load condition has been removed. The device shall also reduce main lobby dispatch time when a pre-determined number of passengers load the car. The load weighing device shall have the design ability to maintain a long term (1 year minimum) consistent accuracy of 50 pounds without the need for re-calibration.

2.3 **GROUP SUPERVISORY SYSTEM BASIC REQUIREMENTS**

2.3.1 The group supervisory control system shall govern the movement of the individual cars in the three (3) car group in a fully zoned or allotted signal system, to provide the maximum efficiency in serving the varying traffic demands, and automatically change the method of dispatching or sending cars to various levels of the building, to provide an effective response to the landing calls of prevalent traffic. The system shall function to accommodate the anticipated varying traffic demands and be sufficiently flexible so that it can be modified to accommodate changes in traffic demands.

- a. Arrange the system to maintain movement of cars to satisfy all traffic demands that occur throughout the day. The system shall function on the basis of conditions at the present time and not on conditions as measured in a previous time period.
- b. Any car, after satisfying all car and landing calls in its direction of travel, shall become available for immediate dispatch to any floor where demand exists regardless of location or direction of travel. No car shall make a trip to either terminal unless a demand exists at that terminal. Car or hall call demands shall have a preference over a car zoning command.
- c. The system shall always dispatch an available car to the First (ground) dispatching floor when no other car is at or is approaching that floor.
- d. Select car for dispatch by non-sequence selection system. The system shall select from available cars and assign a car for loading. Cars shall be selected in the order of arrival at the dispatching floor.

2.3.2 Two Way Dispatching System: Two way dispatching shall function during the periods of appreciable traffic demands in both the "UP" and "DOWN" directions. The cars shall be dispatched "UP" or "DOWN", to respond to the prevailing traffic demands. Each car shall answer unassigned landing calls ahead of it in its direction of travel until all calls not subject to load bypass have been answered. The method of dispatching shall include:

- a. Dispatching the cars from predetermined zones shall consist of an approximate division of the floors served by the number of elevators in the group, unless the anticipated traffic demands should dictate otherwise. A car, after responding to

the last demand in an unoccupied zone, shall become the available car for that zone at that floor. There shall not be a pre-assigned park floor within a zone, the car shall park at the last car or hall call demand within that zone. Other cars that become available shall be assigned to other zones. Available cars shall respond immediately to a demand in their respective zones, except an available car shall respond to a demand in an unoccupied zone, or if the demand in a zone exceeds an adjustable pre-determined number, another car shall be dispatched to that zone.

- b. Dispatching the cars from landings at which they become available shall require a call, after answering its last call, to become available at the landing at which it made its last stop. Available cars at any landing shall be assigned and dispatched to answer service demands in a manner that shall provide equitable service to all floors.
- c. An available car without a demand for service shall park with its doors closed.
- d. The dispatching method shall be sufficiently flexible to provide efficient service for two way traffic that becomes predominant in either the "UP" or "DOWN" direction.

2.3.3 Up and Down Peak Design Requirements:

- a. Provide a programmable clock to initiate and maintain down peak dispatching during an established period for the departure traffic.
- b. Provide down peak automatically whenever the down traffic reaches a predetermined intensity.
- c. The zoning signal system shall consist of a division of the number of floors served by the number of available cars in each group excluding main lobby dispatch car(s). The signal system shall be so configured that the number of floors assigned to each zone or allotting area can be re-configured dependent upon changes in the floor tenants or floor populations. These car zoning assignments can be changed using the full spectrum diagnostic and adjustment tool that will be provide to the Owner along with the related adjustment manuals that shall be provided in the base building elevator contract. Initially set the zones for the full three (3) car group as follows: One (1) car shall be assigned to the ground floor as the up dispatch car and shall also respond to a basement hall call or down registered hall call at the ground floor. Zone 1 = 2 - 6, Zone 2 = 7-11. During the time periods when one (1) car is removed from the three (3) car group one (1) car shall remain at the Ground floor as the up dispatch car and the other car shall respond to hall call demands above the main lobby. Include provisions to permit changing these assignments with the use of a hand held programmable tool. The cars shall reverse at the highest call within their respective zones. Only high zone cars shall respond to registered up landing

calls in high zones, except such calls shall be served by not more than one car when down landing calls are being bypassed.

- d. Monitor the time for each "DOWN" landing calls served by the group of elevators. Should "DOWN" landing calls remain unanswered for a predetermined and adjustable time of approximately forty-five (45) seconds during the down peak traffic period, the lowest such landing call shall be answered by the first up traveling car without higher car calls. The car shall reverse at that floor and respond to "DOWN" landing calls below.

2.3.3.1 Up Peak Dispatching System: Up peak dispatching shall function when traffic demand is primarily in the "UP" direction. Cars shall be dispatched from the first (ground) floor dispatching terminal and then reverse at the highest call. All cars shall be selected for loading and only the selected car shall have "UP" landing lantern illuminated and its doors open. If another car arrives without "DOWN" traveling passengers, it shall park with its doors closed until the load car closes its doors preparatory to leaving the dispatch floor. After passengers leave an arriving car, the doors shall close until the load or dispatch car has left the floor. Cars shall be dispatched when loaded to an adjustable value that shall be initially set at 60% of capacity. Provide a seven (7) day programmable clock to initiate and maintain up peak dispatching during an established period for the determined incoming traffic demand. If at any time during this period, a car is not available at the lower dispatching terminal for loading, a down traveling car shall automatically bypass landing calls until it arrives at the lower dispatching terminal. A keyboard entry shall be available in the signal system that shall assign either one (1) lobby car during off hours or two cars during up peak, the remaining car shall respond to hall call demand above the main lobby.

2.3.3.2 Down Peak Dispatching System: Down peak dispatching shall function where there is a preponderance of down demand traffic. Cars shall be dispatched up from the lower dispatching terminal immediately upon expiration of a minimum door open time for passenger transfer at their lowest call, and unless otherwise specified, shall reverse at the highest call. Provide means to either cancel or prevent the registration of car calls for landings above the car by passengers who are leaving the car at the lowest dispatching terminal.

- a.. Monitor the time for each "DOWN" landing calls served by the group of elevators. Should "DOWN" landing calls remain unanswered for a predetermined and adjustable time of approximately forty-five (45) seconds during the down peak traffic period, the lowest such landing call shall be answered by the first up traveling car without higher car calls. The car shall reverse at that floor and respond to "DOWN" landing calls below.

2.3.4 Off Hour Dispatching System: Off hour dispatching shall function when the traffic demands subside to a degree of very light or inactive status. As the cars become inactive, they shall park with their doors closed in their assigned zone or seek an unoccupied zone. One dispatch car shall be parked at the (ground) floor with its doors closed and load light illuminated. Only with the use of a security card reader in the

ground floor hall call push button assembly shall access to the dispatch car be possible.

- 2.3.6 Independent Service: Provide a key switch in the car station service cabinet, operation of which will transfer the operation to Independent Service. When the car is on Independent Service, it shall respond to all in car signals, but shall not respond to landing calls. Doors shall open automatically and shall be closed by constant pressure on the door close or a car call push button. If the button is released before the doors are fully closed, they shall reverse and reopen. If one car is removed from the group to Independent Service, the remaining cars shall answer all landing hall calls. In the event there are no cars remaining in group operation, hall calls shall not be allowed to register.
- 2.3.7 Hall Call Readers: Provide provisions and related wiring in the ground floor hall call push button fixture for a card reader. Co-ordinate wiring type required with security contractor.
- 2.3.8 Car Out of Service: The signal system shall be provided with a car out of service feature. This feature will allow through the use of any keyboard entry to remove individual cars from automatic service. Once a car is removed from service it shall return to the first (ground) or other assigned floors after responding to all its car and hall call commitments. After a car returns to the first (ground) or as specified floor it will open its doors only if a registered first (ground) floor car call is registered. If a first (ground) floor car call is registered it shall open and immediately close its car doors without normal dwell times. The ability to register car calls will not be possible, only the door open button shall then remain functional. If a car returns to the first (ground) floor lobby without a first (ground) floor car call registered the car shall park at that floor without opening its doors and only the door open button shall remain functional. Emergency Fire Recall Operation shall over ride this feature.
- 2.3.9 Anti-Nuisance Device: A reliable monitoring device shall be provided for each passenger elevator to determine when registered car calls are in excess of passengers entering the car. When the monitoring device determines that the car calls registered are excessive, all calls shall be cancelled and passengers shall then be required to re-register their car calls. This device shall function upon accurate input signals from the car load weighing system.

2.4 **GROUP SUPERVISORY SIGNAL SYSTEM (GENERAL REQUIREMENTS)**

- 2.4.1 The following considerations must be accommodated in the group supervisory signal system provided and installed in order to provide the desired operation in addition to the above basic requirements:
- a. An up dispatch car shall be located at the (ground) level.
 - b. The signal system shall be designed so as to compensate for a reduced number of cars in group operation at any one time. This system must expand the number of floors within a zone or allotting area, dependent upon the number of cars in group operation. In any case, each floor will be incorporated within or

attached to an active zone or allotting area, even if only one car remains in group operation. The utilization of failure timers to provide service to hall calls outside an active zone shall not be accepted.

- c. The signal system shall be designed for selective-collective operation regardless of the number of active cars within the group, ranging from three (3) to only one (1) car.
- d. The signal system shall be designed so that zoning shall not have preference over selective and sequential response to hall or car calls. Cars shall not zone before responding to a sequentially established hall or car call unless a demand is established at that zone floor.
- e. Cars shall park at any floor within an assigned zone or allotting area. After unloading a car call passenger within a zone, a car shall park at that floor, providing that no other call commitments are allotted. There shall not be an assigned mandatory park floor within any zone or allotting area.
- f. The signal system shall be so designed that the selective-collective mode of operation of any car within the system shall not be negated by a zoning demand.
- g. Only one car shall respond to a registered hall call. A signal system which allows more than one car to respond to a single landing hall call shall be rejected.
- h. A signal system that allows cars to park at their last assigned demand floor without regard to zoning or allotting shall be rejected. Such a system would allow all cars to park at the same floor without regard to elevator distribution throughout the building.

2.4.2 The group supervisory signal system furnished and installed shall possess and/or provide, as a minimum, the following feature and functional operating capabilities:

- a. A group supervisory signal system where each car controller can automatically assume the role of the group supervisory signal system in the event that the primary controller signal system car entered into a failure condition.
- b. Hall call destination time preference logic, as opposed to hall call wait preference logic.
- c. An allotting system rather than a pure zoning system.
- d. Design and fabricated as a microprocessor based system, which shall be capable of evaluating all operational criteria and selecting the most advantageously positioned car for service in microseconds.

- e. Software shall be designed to meet expected traffic demands, which is capable of being re-programmed in response to changes in building transportation needs.
 - f. Supervisory signal boards that are readily available from more than one supplier in the industry.
 - g. A system whereby all floors are serviced in the event of hall call signal loss. Multiple button risers within the group if applicable shall be separately fused with separate I/O to registered hall calls.
- 2.4.3 The Elevator Contractor shall have capability to provide full engineering and programming services for the group supervisory signal system procured herein.

2.5 **GROUP SUPERVISORY SYSTEM FUNCTIONAL REQUIREMENTS**

- 2.5.1 Supervisory: A microcomputer (microprocessor) control system shall be provided to perform all elevator group supervisory functions. The microcomputer shall be properly shielded from line pollution and shall be designed to accept software reprogramming.
- 2.5.2 System Operation: Heavy Up Traffic - There shall be one (1) dispatch floor at the first or Ground Floor which is the main entrance to the building. The system shall automatically return available cars to this dispatch floor. When at a dispatch floor, the car shall remain for sufficient time (field adjustable) from five to fifteen seconds, to load passengers. This time shall be capable of being reduced by measuring the frequency of interruptions of the door protective field or load weighing. The cars shall travel upward, serving all car calls and allotted landing calls, and shall reverse at the highest hall call landing or car call landing and return to the dispatch floor. The basement floor shall also be served by this ground floor up dispatch car.
- 2.5.3 Car returning to the dispatch floor shall open doors if designated as load car, or to discharge passengers, in which event the doors shall re-close as soon as passengers have passed through the door protective field.
- 2.5.4 Inter-floor Traffic Control: To achieve a proper balance between service to the dispatch floor and to inter-floor traffic during heavy up traffic conditions, Inter-floor Traffic Control shall cause cars to periodically bypass corridor calls to expedite return to the dispatch floor. The software program shall allow Inter-floor Traffic Control to be readily and automatically adapted to changes in the building traffic demand.
- 2.5.5 Light to Heavy Two Way Traffic: When light traffic conditions exist, the signal system shall distribute the cars throughout the building in zones to reduce the travel time to hall calls.
- 2.5.6 One car shall be stationed at the dispatch floor with doors closed with an up hall lantern illuminated. With no demand for service after a predetermined time, the hall lantern shall

extinguish with the car doors closed.. Upon registration of a hall call, the signal system shall scan each car and allot or assign the call to the car with the least bias count at that instant, that is, the car which can provide the best total service for the waiting passenger's destination time. The entire allotment sequence shall be accomplished in microseconds. Cars responding to hall calls shall be analyzed to determine the ability of individual cars to serve a particular hall call. These service factors shall be:

- a. Car on independent service, inspection or in a failure condition and therefore, unable to serve landing calls.
- b. Car loaded to or beyond 70% capacity.

The above factors shall negate the allotment of these cars to hall calls.

The following factors shall be adjustable over a wide range to suit the changing requirements of the building. Each factor shall be a bias or count against allotment to a particular car and the car with the least count shall be assigned to landing call.

- c. Where incoming dispatch floor is relatively steady, this factor shall be biased heavily.
- d. Distance from car to landing call.
- e. Car stopped at floor, loading or unloading, or idle shall be biased to favor allotment to a moving car because of time loss due to door closing and acceleration time of a stopped car.
- f. Car call stops registered within each car ahead of the landing call to be allotted.
- g. Landing call stops already allotted ahead of the landing call to be allotted.

NOTE: The factors referenced in subsections above shall be biased to favor allotment to the car with the least stops, assuring optimum destination time.

- h. Car call stops already registered in each car beyond the hall call to be allotted.
- i. Landing call stops already registered to each car beyond the hall call to be allotted.

NOTE: The factors referenced in the sections above shall be biased to favor allotment to the car with the least stops already committed beyond the landing call, assuring optimum destination time, not just wait time, for all waiting passengers as well as passengers already in the cars.

- j. Delayed car due to unusually long time for loading or unloading, interference

with door protective devices, or other reasons shall bias against further allotments to the car until operation is resumed. Landing call stops in the car's Demand Memory shall be re-allotted to the other car.

- k. A.C. power off.
- l. Load in cars shall be biased to favor allotment to car with the least car calls or light loads.
- m. Coincident Car and Hall Call: Each hall call registered in the system shall be stored in the hall call memory until the car calls in both cars are scanned for the possibility of allotting the hall call to a car already committed to stop at that floor in the proper direction. If the condition exists, this factor shall be biased heavily in favor of allotting a coincident call. When a coincident call is allotted, only the hall call shall be counted.

2.5.7 Reallotment of Hall Calls: A registered hall call, when answered, may result in loading one or more passengers with one or more destinations. All hall calls in a car's Demand Memory shall be re-examined when any of the following events occur:

- a. Registration of car call.
- b. Door starts to close.
- c. Car delayed at landing (or failure).
- d. Car fully loaded.
- e. Interruption of door protective device.
- f. Additional hall call or calls.

2.5.8 Allotment Program: If the service to any hall call in the car's Demand Memory can be improved, this fact shall be recognized by the Allotment Program and such hall call(s) shall be re-allotted to another car. The re-allotment shall always be done on a converging basis, to improve service, and shall be biased on the same factors as a newly registered hall call. Hall calls in the proper direction shall be canceled from a car's Demand Memory by another car stopping for a car call at that floor.

2.5.9 Dispatch Operation: Dispatch operation shall establish priority service at the dispatch floor. Dispatch operation shall insert a demand into the system that shall call a car to that floor. The responding car shall accept dispatch status upon arrival. The operation at a dispatch floor shall be as follows:

- a. Based upon security concerns a car with a dispatch status shall maintain its doors closed with an up hall lantern illuminated.

- b. A car shall be removed from dispatch status when a car call is registered after a pre-determined time period.
- c. Removal from dispatch status shall extinguish the hall lanterns. This shall allow the registration of another demand.

2.5.10 Heavy Outgoing Traffic: Hall calls shall be allotted on the same bias as described under Subsection 142000.2.5.8 above. During periods of intense outgoing traffic, dispatch operation shall be discontinued and all cars shall be available to serve corridor calls above the dispatch floor. Cars with pre-selected percentage load shall bypass all hall calls, and any calls allotted to such cars shall be re-allotted as described above. Down hall calls shall be timed to assure service to calls that may be bypassed by cars with bypass loads.

- a. Time out calls shall be assigned to the most advantageous car. The assigned car shall accept one time out call and shall be inhibited from accepting further allotments until the call is canceled. The call may, by coincidence, be canceled by another down traveling car, in which event the assigned car shall be immediately available for other allotments.

2.5.11 Fail Safe Protection: If there is a failure in the microcomputer supervisory control signal system, the cars shall automatically switch to another controller, to a separate selective-collective control signal system independent from the failed controller microcomputer, shall continue to provide service. If the system loses the hall call push button circuit, then a wild car sequence should commence whereby service is provided to each floor until normal hall call service is restored.

2.5.12 Continuity of Service Delayed Car: The length of time that a car has its door power applied without the door becoming completely closed shall be monitored. If this time becomes excessive, the "Door Close" signal shall be removed and the "Door Open" signal shall be activated. When the door becomes fully opened, the "Door Close" signal shall again be applied and the door closing time circuitry shall become activated. This cycle shall continue until either the car is manually removed from group service or the doors become completely closed. If the latter condition occurs, the car shall be returned to group service operation.

- a. The length of time the car door remains open shall be monitored. If an obstruction as detected by the protective field prevents door closure for an excessive period of time, the car shall be removed from group service and a signal shall be activated to indicate this condition. When the obstruction is removed and the door becomes completely closed, the car shall be returned to group service.

2.6 **SYSTEM EQUIPMENT AND CHARACTERISTICS**

The system for the group of elevators shall consist of the necessary interface equipment

and centralized supervisory equipment.

- 2.6.1 The signal supervisory control system furnished and installed by the Contractor shall be the product of one manufacturer of established reputation satisfactory to the Architect/Owner. If the manufacturer of such equipment is other than the Contractor, the overall responsibility for coordination of its design and interfacing all equipment successfully thereby providing satisfactory operation of the completed installation, shall rest with the elevator contractor.
- 2.6.2 If the manufacturer of such equipment is other than the Contractor, the overall responsibility for coordination of its design and interfacing all equipment successfully thereby providing satisfactory operation of the completed installation, shall rest with the elevator contractor.
- 2.6.3 Loss of Power: After a power failure condition, the supervisory system shall be capable of restarting normal operation when normal power is restored.
- 2.6.4 Microcomputer Panel: The supervisory signal system for the group of elevators shall be contained redundantly in each controller. Each controller may act as a stand-alone signal system for the group in the event of a failure of the designated primary signal system. The signal system shall have the logic whereby the signal logic shall be automatically transferred from one controller to another within the group. The elevator supervisory control shall be a software program located in the memory of each individual car microprocessor.
- a. The printed circuit modules containing the integrated circuit elements and other electronic equipment shall be plugged into pin receptacles. The wiring between all pins to adjacent receptacles shall be connected by a controlled automatic wiring machine, or as approved.
- 2.6.5 The voltage requirements of the elements in the cabinet shall be adapted to the building supply voltage through step down/ up transformers. Autotransformers or power transistors or zener diodes are prohibited.

2.7 **ELEVATOR MONITORING SYSTEM**

- 2.7.1 Provide a 17" Color LCD (1280 x 1024) Resolution Display for the group of elevators which shall be provided as an integral component of the supervisory signal system. This display shall depict the group car status, car and hall call registration, car direction, car position and the allotment or assignment of hall calls. Provisions shall be made for the connection of two (2) additional future LCD and keyboards outputs for remote locations.
- 2.7.2 Monitoring and Diagnostic System:
- a. General: Provide on-site and remote monitoring and diagnostic functions. Provide all associated hardware, software, wiring, conduit and manuals

required for the installation of the system.

- b. Machine Room Monitoring Station: The machine room monitor shall display the individual group or individual car status of each elevator and each registered car and hall call. The computer shall download information to a stick drive and the printer to produce hard copies of the data. Provide memory capacity for at least the immediate 30 days, 24-hour periods, in hourly blocks of 15 minute segments, running from hour to hour (i.e., 7:00 a.m. to 7:00 a.m.). These remote stations shall display and accumulate, for the Owner's retrieval and use, information for the following operating conditions:
1. Summary of hall call registration events by floor, direction, and duration, totaled in 15 minute and 60 minute blocks with breaks made on the hour using an internal clock.
 2. Indication of hall call registration duration averaged for each 15 minute and hourly periods.
 3. Indication of percentage of calls answered within 30 and 60 seconds in each 15 minute and hourly periods.
 4. Indication of time periods during which individual elevators are not in group operation.
- c. Machine Room Controller Station: Provide one color LCD display and accessories to maintain the group of elevators which shall include items such as CPU, keyboard and cable required to provide the specified functions. Provide portable printer in remote location to obtain hard copies of specified elevator data. A Service Tool or device shall also be provided, for the machine room, to simulate in car operations and to run each elevator from the machine room. The color LCD monitor (machine room shall display the following operating conditions:
1. Car position indicator for each car.
 2. Location and direction of hall calls registered.
 3. Indication to show allotment of hall calls to an individual car.
 4. Indication of calls registered within each car.
 5. Direction of car travel.
 6. Time clock and temperature of elevator machine room areas.
 7. Indications individual to each car to show:

- a. Car in group service.
 - b. Car out of group service.
 - c. Car on Inspection service.
 - d. Car on Independent service.
 - e. Car turned off.
 - f. Car bypassing with 70% loading.
 - g. Opening or closing mode of car doors.
 - h. Car failures: Detected faults are to include but not limited to the following: phase faults, control fuses, brown out, door lock, gate switch, stop switch, governor switch, up and down final, safety and tape switch, AC VVVF or SCR drive unit failure, re-level, door protective field fault, fire service, up and down limit, over speed, door operation failure, clipped door lock, car out of service, independent and inspection modes, and any other safety circuit device not mentioned.
 - i. Light indications for special features.
 - j. Car over load condition and shut down.
 - k. Car on Emergency Power.
- d. The Contractor shall provide a hardware and software package to provide a full menu driven screen, customized reporting, auto dial-out mode, and auto-call mode for gathering, reporting and reviewing data at a programmable desired time. The software shall receive and interpret alarm signal displays.
- e. The Contractor shall provide all training and instructional manuals required to place the monitoring and diagnostic system into operation.
- f. The individual car "out of service" lobby park switches shall be provided in the Fir Command Center, when activated the individual cars shall return to the Ground or First Floor dispatch Level and open and close their doors and be removed from normal group operation. The car shall remain with its doors closed with only the in car door open button functional. A car "out of service" demand may also be initiated through the use of a keyboard entry at the elevator machine room.
- g. Provide an alarm signal that shall be registered and identify any elevator that has left normal group operation. This signal shall identify a car that has entered

into a failure condition or has been taken out of service. This alarm signal shall be both audible and visual. The alarm signal may be turned off with keyboard entry but the visual indicator shall remain pictorially on the LCD Display. The failure audible and visible signal shall be activated when any of the five (5) below failure conditions take place:

Failure Conditions

1. Car is on inspection.
2. Car is on independent.
3. Safety circuit is open.
4. Car stops between floors.
5. Car enters any failure mode.

Once any car enters into a failure condition, the visible signal shall remain on the LCD Displays but the audible signal may be turned off with a keyboard entry. This signal shall remain until the car has been returned to normal group operation.

2.8 **ELEVATOR MACHINES**

2.8.1 **GEARLESS**

2.8.2 New overhead conventional Imperial gearless Model 525 traction machines with deflector sheaves shall be provided to replace the current Otis geared traction 22 CT machines for cars 1 - 3. The conventional gearless machines shall consist of a slow-speed motor, traction drive sheave with two (2) brake drum shoes all compactly grouped on a single shaft supported with two (2) rigidly mounted pedestals to the structural steel bedplate. The traction sheaves for the conventional gearless machines shall have a minimum diameter of 25" of hard alloy cast iron or steel, suitable V grooved to produce the traction required. Sufficient excess thickness shall be provided for reasonable wear in the V grooves. Traction sheave and brake shoes shall be secured to the armature in a positive manner. Accurately machined surface or pads shall be provided to seat all parts secured to the bedplate. The use of brackets or other extensions bolted to the bedplate as support for principal parts shall not be permitted. All parts shall be bolted in place with finished bolts, lock washers and nuts, or cap screws. Tapered dowels shall be used to accurately locate parts where necessary to insure proper positioning and alignment. The hoisting machine shaft shall be forged steel, close-grain electric-furnace cast steel, or equal. The new deflector sheaves may be mounted in an elevated machine structure in the machine room or they may be provided with machine beam interfacing steel mounting to either the current machine beams of

the building structure. This hoistway mounted deflector can be so mounted if the code required overhead is available. The cost of an elevated machine room mounted deflector sheave or one that is mounted under the machine room slab shall be included in the base building elevator contract.

- 2.8.3 The hoisting machine motor shall be of the direct-current or variable voltage variable frequency with flux vector control of the slow-speed type, which shall develop the required high starting torque combined with low starting current. The motor shall be suited in all respects to the variable voltage control hereinafter specified and shall be of rugged design, with all parts capable of meeting the severe requirements of passenger elevator service. Field coils or stator windings shall be form or spool wound. The armature or rotor shall be electrically and mechanically balanced, and the traction sheave and brake drum shall be mechanically balanced. If a DC motor is provided it shall run in either direction under full load conditions without excessive heating or sparking, and with one and the same brush setting for all loads and speeds within the capacity range. The speed of the motor, when operated with the controller in full-speed position, shall not vary more than 3 percent from the normal rated speed under all loading conditions within the capacity range. The insulated resistance between conductors and the frame of the motor shall be not less than one meg ohm. All dielectric materials shall successfully pass a breakdown test of 1500-volts, 60-cycle alternating current applied for 1 minute.
- 2.8.4 Bearing pedestals shall be rigidly fastened to the main structure of the bedplate. Bearings shall be either self-aligning or machined integral with the base of the hoisting machine to assure positive alignment. Bearings shall be of the anti-friction bearing metal, or ball or roller bearing type. Bearings of anti-friction bearing metal shall be provided with oil reservoirs, automatic self-lubrication, oil level gauges, and an approved means for draining and flushing bearings. The bearings shall not exceed 800 pounds per square inch. Ball or roller bearings shall have grease gun connections and drain plugs. The bearings and lubricant reservoirs shall be virtually dust tight and shall incorporate effective lubricant seals or other means to prevent lubricant leakage.
- 2.8.5 The hoisting machine shall be provided with an electro mechanical brake, consisting of a brake drum, two brake shoes suitably supported from the machine bed, two heavy springs to apply the brake, and an electromagnet to release the brake. Each brake drum shoe and each spring shall be of sufficient size and strength to stop and hold the car when carrying 125 percent of rated load. The brake drum shall have the wearing surface and edge of the flange turned true and smooth, and the wearing surface shall run true within a maximum eccentricity of .005 inch. The brake shoe shall be lined with a suitable fire proof friction non asbestos material shaped to the shoe so that the drum will run free with a small clearance. The spring shall be helical, operated in compression, and shall apply the brake when released by the magnet. The brake magnet shall be designed so that the release shall be quick acting. The brake application shall be automatically controlled by magnetic retardation to obtain noiseless, smooth, and gradual stops under all conditions of loading. The circuit of the brake magnetic coils shall be operated directly or indirectly (1) upon the normal stopping of the car, (2) upon failure of any of the several units of the equipment to function properly for the safe operation of the car, (3)

by the various safety devices, or (4) by current failure. If an AC Drive Motor is used with two (2) brake drum pads each one shall be capable of lowering and holding 125% of the capacity load.

- 2.8.6 Drum Brakes Only: The brake shall be of the two-section shoe type, each shoe shall be capable of stopping and holding the car under all conditions of loading or operation at 125% of the rated load. Brake shoes shall be applied by springs under compression. The pressure shall be adjustable. The brake drum shall be keyed or shrunk directly to the work shaft having the wearing surface and the edge of the flange turned smooth and balanced. The wearing surface shall run true within a maximum variation of 0.005". The brake shoes shall be lined with a suitable fireproof friction non-asbestos material so shaped to the shoe that the drum will run free with a normal clearance. Brake shall be for direct current operation only and shall be released by an electromagnet and applied by springs. The brake application shall be automatically controlled to obtain noiseless, smooth operation. The circuit of the brake magnet shall be opened:
- a. After the normal stopping of the car.
 - b. Upon failure of any of the several units of equipment to function properly for safe operation of the car.
 - c. By the various safety devices.
 - d. When safety circuit is opened.
 - e. On power failure.
 - f. The elevator shall stop electrically and then the brake shall apply. An elevator system where slow down and normal stopping is achieved by the utilization of the brake shall be rejected.
 - g. An overload condition while the car is at the floor with its doors open.
- 2.8.7 Provide ascending car overspeed and unintended car movement protection on each traction elevator. On the AC Gearless machines provide drum brake shoes or disk brakes whereby each shoe shall be capable holding 125% of full capacity load after the car is run down to the lowest floor at contract speed without the need to re-level. This device shall only apply for an ascending car overspeed condition or for unintended movement at the floor with the car and or the landing doors open. The activation of this braking system shall not be activated for any other condition.
- 2.8.8 The hoisting machine motor shall be of the direct current or VVVF slow speed type, which shall develop the required starting torque combined with low starting current. The drive motors shall be rated at 240 starts per hour full load up RMS. The motor shall be suited in all respects to the variable voltage DC or variable VVVF AC frequency control hereinafter specified and shall be of rugged design, with all parts capable of meeting the severe requirements of elevator service. Field coils shall be form or spool wound.

Copper wire is required on all portions of the traction machine, armature or rotor windings, field coils and brake coils. Aluminum wire of any type shall be rejected. The armature or rotor shall be electrically and mechanically balanced and the traction sheave and brake drum shall be mechanically balanced. The motor shall run in either direction under full load without excessive heating or sparking and with identical brush setting for all loads and speeds within the capacity range for DC motors. The hoist motor design voltage for DC Motors shall not exceed 250 Volts. The motor H.P. or KW rating and frame design shall be such that forced air cooling is not required for either AC or DC machines. The Contractor shall supply the required horsepower calculations, frame numbers and electrical data chart information to verify that the horsepower rating of the supplied drive motor meets the criteria of these specifications. The speed of the motor, when operated with the controller in full speed condition, shall not vary more than 3% of the normal rated speed under all loads within the capacity range of the elevator without regard to direction of travel. All dielectric materials shall successfully pass a breakdown test of 1500 volt, 60 cycle alternating current applied for one minute. The insulation resistance between conductors and the frame of the motor shall not be less than two meg ohms. The motor shall be protected by either a mechanical DC or AC overload in the branch circuit between the drive output and the hoist motor. The below listing represents the machine and drive motor requirements for each elevator:

Elevator	Machine Type / Model /Application	Minimum Drive Motor HP	Minimum Drive Sheave Diameter With Drum Brake
1 - 3	Conventional Gearless Machine Roped 1:1	15 HP	20"

2.8.9 Provide over speed protection in the down direction, over speed protection in the up direction and uncontrolled motion in the door zone in accordance with the requirements of ASME A17.1.

2.9 **CONTROL EQUIPMENT**

2.9.1 General: Provide solid state "closed loop" modular microprocessor based control equipment to allow complete static logic control for adjusting elevator speed, acceleration, deceleration, leveling and stopping. The elevator control shall be either a variable D.C. voltage type with automatic leveling with SCR Direct Drive Control or VVVF drive with automatic leveling and flux vector control. The system shall be designed to prevent damage to the motor from overload or excess current and to automatically disconnect the power supply, apply the brake and bring the car to rest in event of power failure or safety device activation.

2.9.2 Provide smooth acceleration and deceleration by variable voltage/frequency applied to the hoisting motor, and by dynamic braking and stopping before brake application.

- 2.9.3 Phase Reversal and Failure Protection: Provide means which shall not allow power to be delivered to the drive machine in the event of a Phase Reversal, Loss of Phase of Poly Phase alternating current or low voltage which might result in an elevator malfunction.
- 2.9.4 Solid-State Control: Use solid-state modular microprocessor to provide complete static logic control for adjusting elevator speed, acceleration and deceleration and leveling. To control and transmit logic instructions to the elevator. The Contractor shall submit SCR or VVVF drive duty data charts to the Owner for approval prior to fabrication.
- 2.9.5 Controller Unit:
- a. Provide a controller for each elevator. The controller equipment shall be contained in a NEMA 1 rated sheet metal cabinet enclosure so that dust, dirt and water shall not interfere with panel components. Provide enclosure with lockable hinged doors. Provide ventilating louvers and an exhaust fan to dissipate controller heat.
 - b. The printed circuit modules containing the integrated circuit elements and other electronic equipment shall be plugged into pin receptacles. The wiring between all pins to adjacent receptacles shall be connected by a tape constructed by an automatic wiring machine, or as approved.
 - c. All panel wiring shall be neatly formed and tied. All leads except for control and signal circuits shall be provided with either solder or solder less lugs. Control and signal wires shall be brought to accessible washer type or solder terminals or studs. The wiring of the panel shall be the flame-resisting type.
 - d. The power circuit relay and contactors shall be equipped with contacts designed to prevent fusing.
 - e. The voltage requirements of the elements in the cabinet shall be adapted to the building supply voltage through step-down transformers with numerous secondary output voltage taps.
 - f. Provide coordinated fault protection which protects the entire power circuit against short circuit conditions, limited faults arising from partial grounds, partial shorts in motor armature, or in the power unit itself, protects drive motor against sustained overloads and provides semiconductor transient and incoming line phase sequence protection.
 - g. Mount the control equipment on a panel of approved material that shall be securely mounted on self-supporting frames.
 - h. Controllers containing solid-state devices and memory equipment that shall be designed for a high level of noise immunity, properly shielded against line pollution, RF, and high temperature operation.

- i. Provide isolation and suppression protection for the proper operation of solid-state devices and components.
- j. Acoustical noise measured from any location approximately 5' from the elevator equipment, in the machine room, shall not exceed 70 dba during normal elevator operation. Structure borne noises shall not exceed 65 dba measured at the top landing hoistway door.
- k. Ground all non-current carrying metal parts in the machine room in accordance with NFPA 70. Provide total equipment BTU output for each elevator.
- l. Prior to contract award the elevator contractor must submit certification that the control equipment has been certified for "Fire and Shock" by both NFPA 70 and UL.

2.9.6

STATIC DC DRIVE - SOLID STATE CONTROL. If DC drive motors are provided the contractor shall provide an SCR Drive System which shall meet the design parameters as related below:

- a. Provide a voltage control system that utilizes direct current voltage obtained from a 3 phase (6 pulse) or a 6 phase (12 pulse), full wave regenerative silicon controlled rectifier drive unit. Provide means for proper heat dissipation and overheat protection (include thermal overloads). Provide for proper switching arrangements to permit the passage of regenerated power and a smoothing reactance to eliminate mechanical vibration and structure born sound from ripple voltage transients. Limit line notching to a maximum transient width of 100 microseconds, with less than four percent energy loss when measured at the machine room disconnects. Limit overall main line noise to less than that would be caused by the equivalent motor-generator set with filter equipment.
- b. Control and limit the passage of regenerated energy to not affect any voltage sensitive system such as UPS sources for computers.
- c. Use electronic feedback to limit the current through SCR's and the motor. Fuse each power feed line to protect against surge current. Prevent runaway due to closed loop feedback circuit failure.
- d. Provide means to prevent damage to circuit elements (SCR fuses, solid state boards, etc.) during high speed stops (emergency stop switch, door lock etc. activation, etc.). An elevator shall not be excepted if upon a high speed stop, equipment component failure is realized.
- e. Provide copper wound properly sized Isolation transformers with a minimum KVA rated to provide 250% acceleration current based upon the full load up run current of the elevator at contract speed. The wire gauge for the copper windings of the Isolation Transformers shall be at least equivalent to the gauge

required if the transformers were wound with Aluminum wire. The maximum impedance shall be 4% at 50 degrees C. Do not provide Auto-Transformers or Line Inductors.

- f. Provide copper wound properly sized choke coils.
- g. The equipment shall be designed to operate at 90% - 110% of the normal line voltage and plus or minus 3% of feeder frequency without damage or interruption of elevator service. Provide protective devices to prevent damage on over or under voltage condition.
- h. The static motor drive unit shall be especially designed for elevator service and must comply with ASME A17.1. At no time shall the motor be used in a plugged mode, nor shall load absorbing ballast resistors be used except for emergency stopping as a result of line loss.
- i. Noise Suppression for Solid-State Devices:
 - 1. Provide solid-state devices designed for a high level of noise immunity. Provide suppression devices incorporated in the power supplies and inputs and outputs associated with solid-state components.
 - 2. Protect building system power against line voltage transients by providing each elevator drive system with a step down isolation transformer. Provide chokes for the motor and devices to limit distortion to not more than 4% RMS of base 60 Hz line voltage, with frequencies above 600 Hz attenuated at minimum of 12 db per octave. Measure voltage distortion requirements at secondary of building system transformer used to provide power to elevator system.
- J. The output voltage from the isolation transformer delivered to the SCR Drive shall not exceed nor be less than the value as determined by the following equation: $24/25 = \text{Impressed SCR Drive Voltage}/\text{D.C. Hoist Motor Voltage Rating (Loop Voltage)}$
- k. The KVA rating of the isolation transformer shall be as follows:

$$\text{KVA (minimum)} = (D * .85 * I (\text{FLRC}) * V (\text{FLRV}) \square 1.043 * \square)1,000$$

Definition of Terms:

- a) D = 1 @ 240 starts/hour
 - b) FLRV = Full Load Running Voltage (Loop)
 - c) FLRC = Full Load Running Current (Loop)
- l. Provide a drive system rated at 240 starts/hour full speed full load up (RMS).

- m. Isolate the 360 HZ noise being transmitted into the hoist machine base, rope, car, guide rails and lease spaces.
- n. The SCR Drive unit shall be isolated from the floor or beams by isolation pads to prevent transmission of vibration to the building structure.

2.10 **OPERATION PANELS AND SIGNAL FIXTURES**

2.10.1 Construct stainless steel faceplates for landing push button with flush mounted elements, with not less than a 1/8" thick dimension. The cover plates shall fasten to a separate sub-plate that shall be tapped to receive the cover plate and related fastening screws. The push buttons and key switches shall be fastened to this sub-plate. Any hall call button configuration which has its button elements and switches fastened to the cover plate shall be rejected. Install the car operating elements at dimensional code conforming locations. Provide # 14 gauge stainless steel (Brushed # 4 or approved equal) return panels for both the main and auxiliary car stations. Engrave the following statements over the car panel operating push button elements, switches and indicator lights on all cars:

- a. The following engraving as approved, shall appear over the main return car operating push button elements, switches and indicator lights and under the digital position indicator:

ELEVATOR	CAPACITY
1 - 3	2,000 lbs

[Engraved car capacity shall have a minimum of 1/4" letters - backfill letters with red paint]

- b. The following engraving shall be incorporated within the main car station operating push button elements, switches and indicator lights:

CAR NO.

[Engraved car number shall have a minimum of 1/4" letters]

- c. The elevator number shall be engraved on the main car station above the operating push button elements, switches and indicator lights:
- d. The no smoking graphic shall be engraved on both the main and auxiliary car swing return panel as related by the applicable building code.
- e. Provide a flush state inspection certificate window and related rear frame in the

cover of the keyed swing service cabinet door in the main car station. If it is not necessary to post this state inspection certificate within the cab then insert this statement in this window:

The elevator inspection certificate
is available for review at the
building management office.

- 2.10.2 Push Buttons: Buttons shall be so designed that a spring shall take up the initial pressure from which contact is made and further pressing shall seat the button on or in the sub plate. Call buttons shall be a minimum of 3/4" in the smallest dimension. Moderate pressure only shall be required to activate the push buttons. Push buttons that require excessive pressure to activate their related function shall be rejected. Submit sample for approval. Landing call and designated car push buttons shall also serve as registered call signal indicators, with the function indelibly and legibly identified by legend or arrow. When a landing call button is operated, the button shall illuminate to indicate that the call has been registered. The signal shall be extinguished when a car has responded to this registered call. The light for each indication shall be enclosed in a light tight compartment and arranged to illuminate only one indicator. The landing call button cover plates shall be brushed # 4 stainless steel with Flush Micro-Motion Red LED Down and Green LED for Up illuminating ring push buttons with a concave center such as produced by Adams Survivor or PTL Centurion or an approved equal.
- a. Car push buttons for cars 1 - 3 shall be Adams Survivor Vandal Resistant push buttons with an LED lighting perimeter or PTL Centurion Vandal Resistant push buttons or the approved equivalent and shall have stainless steel die cast raised letters and Braille symbol (Medallions) as produced by Stencil Cutting and Supply Company. Provide type CW1 satin stainless steel base with CW2 satin stainless steel floor or symbol designation inserts. The CW1 base and the CW2 insert shall be flush mounted in the return panels to the left of the push button and operational elements that shall fit flush within the confines of the CW1 base. Submit total sample configuration to the architect for approval. The car call push button return panels and header shall be 14 gauge brushed # 4 stainless steel as identified on the architectural drawings. The return panel shall be countersunk to receive the push button elements.
 - b. The hall call push button fixture cover plates shall be fabricated from 1/8" minimum thickness stainless steel with a brushed # 4 finish as shown on the architectural drawings. These cover plates shall include the following: Hall call push buttons, emergency power light, Emergency Recall Operation Switches and related indicator lights on the first (ground) and 2nd floor designated fire floor levels (Verify with local Fire Marshall). Each push button cover plate shall be engraved on each floor with the verbiage "In Case Of Fire Elevators are Out of Service" with related Pictograph engraved for all elevators. Flush Red LED for down and Green LED for the up direction illuminating ring push buttons with a concave center with two (2) micro switches per button as Adams Survivor or

PCL Vandal Resistance Push buttons or the approved equivalent shall be provided for cars 1 - 3. Submit proposed configuration to owner for approval. The hall call push button elements and switches shall be mounted on a sub plate independent from the cover plate. Push button or key switches that are mounted to the cover plate shall be rejected. The elevator contractor shall provide all the wiring required to realize a completely functional emergency communication system.

- c. There shall be two (2) push button risers for cars 1 - 3 and one (1) concealed riser for car one (1) only in the right upper entrance frame.

2.10.3

Car Operating Panel for All Elevators: Place the main car operating panel on the right side of all center opening door configurations and the auxiliary car operating panel on the left side. Both the main and the auxiliary car operating panels shall contain all controls for the type of operation specified in Paragraph "Car Operation and Control". The centerline of the top button in each car station shall not be more than 48" above finished floor. The car panel shall contain the following:

- a. Devices in the exposed section:
 - 1. Illuminated LED operating buttons identified to correspond to the landings served by the elevator on both the Main and Auxiliary Car Stations.
 - 2. "DOOR OPEN" and "DOOR CLOSE" buttons that function during normal operation on Main and Auxiliary Stations. A door close push button that functions only during Emergency Operation and Independent Service shall be rejected.
 - 3. Key operated Phase II emergency In-Car Operation Switch and a illuminated visual and audible signal (Main panel firefighters' cabinet) and a car cancel button.
 - 4. Alarm bell push button (Main and Auxiliary Panels) that shall initiate both the alarm bell and also activate the "car call" function in parallel operation with the car call push button.
 - 5. Over Capacity Light and Buzzer (Main Panel).
 - 6. Key Stop Switch (Main Panel).
 - 7. Two-way communication device with full duplex operation with both visible and audible signals (Main panel) meeting the requirements of ASME A17.1. Flush mounted. Provide "off set" speaker grille with in main swing return panels. A "Help" emergency call push button with illuminated collar and related verbiage shall be provided identical in

design to the push button elements.

- b. Devices in the locked service cabinet:
1. Key operated inspection switch to transfer car control to key access for top of car inspection operation, pit access and to prevent operation of the car from the control panel.
 2. Key operated independent service switch where the key is removable in either position.
 3. Four position three speed keyed fan switch.
 4. Key operated door protective field switch. When turned off the car doors shall close at reduced nudging speed.
 5. Nudging Buzzer.
 6. Ground fault duplex 120 volt AC volts convenience outlet with ground.
 7. Car light key switch with "on" and "off" positions.
 8. Keyed operated emergency light test switch that shall disconnect all power from normal car lighting.

2.10.4 Car Certificate Frame: Provide a flush state inspection certificate window with rear frame in the keyed access service panel under the main operation as relate above in 140000.2.13.1.

2.10.5 Switches and Devices: Provide EX Series switches and devices on the car operating panels. Each device and its operating positions shall be legibly and indelibly identified. Locate car dispatching buttons in identical positions in car operating panels for corresponding floors. The position of car dispatching buttons shall be uniform for all cars.

2.10.6 Car Position and Direction Indicator and Audible Signal: Provide a 16-segment, Red LED Position and Direction Indicator to produce the full range of alphanumeric characters to indicate both the floor position and direction of travel. Individual characters shall be a minimum of 2" high to allow for easy viewing from all areas of the car. This fixture shall be similar to the LED car position and direction indicator as used by Otis in their 411 luxury product line. This position and directional Indicator shall be mounted central in the cab header. This in car position and directional indicator shall be an integral part of the cab header and shall not have a cover plate. As the car travels through the hoistway, its position shall be indicated. Change of floor position indicator shall be instantaneous and shall be accomplished approximately midway between floors. Provide an adjustable audible sound as the car passes or stops at a floor, and

the corresponding floor designation must illuminate. This audible signal shall have a minimum of 20 dba with a frequency no higher than 1500 Hz. Also provide voice announcement if required by ANSI A117.1.

2.10.7 Hall Lanterns: Provide white triangle acrylic directional arrow lenses with visual and audible signals located to the right of the car entrance frame at all floors above and below the main lobby with 2" minimum directional arrow lenses. Provide a green up and red down directional filter behind each directional arrow or provide Red and Green LED's in lieu of colored filters. Include directional arrows in the digital position indicator at the First Floor (Ground) level position indicator. The designation directional LED or illuminated color lens filter that shall be green for up and red for down or as approved by the architect. Provide an adjustable audible gong that shall sound once if car will next go up and twice if car will next go down.

2.10.8 Communication System:

- a. Provide traveling cable wiring, car wiring and wiring from the machine room to an outside pre programmed emergency operator. One (1) Master Station shall be located in the elevator machine room.
- b. In each cab the activating of either an alarm push button or the activation of the emergency call push button shall illuminate a specific annunciator light and sound an audible signal at the security room, main lobby information / security desk in accordance with the requirements of ASME A17.1 and shall initiate the two-way full duplex communication system.
- c. Upon receipt of an alarm signal an operator shall be able to initiate a signal that shall cause an acknowledgement light to flash within the car. Two (2) way speaker **full duplex** communication shall be possible between the car and operator.
- d. The two (2) way Full Duplex Speaker Phone Communication system shall have the following features:
 1. Between any car and the machine room *.
 2. Between any car and an outside automatic dial operator *.
 3. The supplier of this full duplex speaker system shall be Vandal Proof Products a division of EMS.

Note: * Master Stations

2.11 **HOISTWAY AND CAR EQUIPMENT**

2.11.1 Existing overhead machine beams shall be retained and re-used.

- a. The existing geared machine beams shall be interfaced with the new Imperial

gearless machines. Additional supports for the new deflector sheave shall be provided by the elevator contractor. If the hoistway overhead has a dimension that will allow the deflector sheave to be placed in hoistway then it shall be fastened to the underside of the machine beams. If in fact the overhead is dimensionally insufficient then the deflector sheave shall be mounted in a sub frame under the imperial 525 gearless machine. Provide sheave guards for the new drive and deflector sheaves. Provide demountable drive sheave rims for the new gearless traction machines.

2.11.2 Guide rails.

- a. All car and counterweight guide rails shall be retained and re-used. All car and counterweight rail fasteners including fish plate fasteners shall be tightened. The running surface of both the car and counterweight rails shall be cleaned to remove rust and any other contaminates. The non running rail surfaces of both the car and counterweight rails shall be painted black.
- b.. Pit Equipment:
 - 1) Buffers: Drain the oil from both the car and counterweight buffers and flush out with cleaning compound and refill with new buffer oil.

Seismic Requirements:

- a. Provide seismic guarding of equipment in accordance with Section 8.4.3.
- b. Provide seismic car enclosure requirements in accordance with Section 8.4.4.
- c. Install seismic plates under the car top and counterweight top and bottom roller guide assemblies. Section 8.4.5, Section 8.4.7.1.2
- d. Provide car safety seismic guarding of equipment in accordance with Section 8.4.3.
- e. Install a seismic switch in the elevator machine room and provide related signal logic. Section 8.4.10.1.1.
- f. Install a counterweight derailment switch and provide related signal logic. Section 8.4.10.1.1.
- g. Provide seismic equipment requirements in accordance with Section 8.4.10.1.2
- h. Provide seismic equipment requirements in accordance with Section 8.4.10.1.3
- i. Provide driving machine and sheave restraint requirements in accordance with Section 8.4.9.

Car Balance:

- a. When the equal roller guide pressure is realized on the main rail and the car is statically balanced so that equal roller guide pressure on each roller is the same load the car with 50 pound test weights and add or subtract counterweights until the car is balanced precisely at 42.5% for each gearless car 1 - 3. Each elevator drive shall be sized for this balance percentile. Each counterweight shall consist of cast iron, steel or lead sections fitted into a frame. Concrete or composite weights shall not be permitted. Each weight section shall be solid. Cracked sections shall not be acceptable.
 - 1) Guard: Un-perforated metal guards shall be installed in the pit on all open sides of the counterweight. These guards shall be installed in accordance with ASME A17.1.

2.11.3 Normal Terminal Stopping Devices

- a. Upper and lower normal terminal stopping devices shall be provided and arranged to exponentially and automatically slow down and stop the cars at the top and bottom terminal landings, with any load up to and including rated load from any speed attained in normal operation. High speed stops shall not be considered as an exponential slow down. Such devices shall function independently of the operation of the normal stopping means and of the final terminal stopping device. The normal terminal stopping device shall be so designed and installed so that it will continue to function until the final terminal stopping device operates. A normal terminal stopping device that allows the car to enter a final terminal stopping device shall not be accepted.
- b. Slow down and normal stopping devices shall be furnished and installed either on the car top of each car or mounted at the terminals in the hoistway enclosed dust proof cases. The devices shall be so arranged that as the car approaches either terminal landing the device shall automatically bring the car to a smooth stop at the terminal landing. The device shall use either LED, magnetic or other code conforming means to slow down and stop the elevator without the use of mechanical switches.

2.11.4 Emergency Terminal Stopping Device

- a. Provide an emergency terminal stopping device that shall independently remove power from the driving machine motor and brake in the event that the normal slow down device and normal terminal stopping devices fails to slow down and stop the car in the intended manner. This device shall use mechanical switches with logic independent of both the normal stopping means

and the normal terminal stopping device.

2.11.5 Final Terminal Stopping Devices

- a. Provide final terminal stopping devices for the elevators, arranged to automatically stop the car and counterweight within the top clearance and bottom over travels. These devices shall be independent of the operation of buffers and final and emergency terminal stopping devices.

2.12 **WIRING**

2.12.1 Wire in accordance with NFPA 70 NEC. Conductors shall be copper, stranded with moisture and flame resistant outer covering throughout. Provide all new wiring, flexible conduit, rigid conduit and related fittings with moisture resistance provisions as outlined by NFPA 70 NEC. Upon approval the vertical hoistway dust maybe used upon approval from the Architect. The minimum size of conductors, exclusive of those which form an integral part of control devices, shall be No. 12 for lighting circuits and No. 14 for all operating, control and signal circuits. Protect all wiring regardless of voltage rating in zinc coated rigid steel conduit, intermediate electrical conduit, electrical metallic tubing (EMT) or metal wire ways and outlet boxes. Flexible metal conduit with a green equipment ground conductor may be used for the short connections not subject to moisture, oil or embedment in concrete. Thread-less fitting shall not be used with rigid galvanized steel conduit. Electrical connections to machinery shall have extra length to permit 2" minimum displacement without damage. All flexible and solid conduit fittings shall have two (2) steel locknuts and threaded insulation bushing on all terminating points. All wiring shall test free from short circuits and grounds and the insulation resistance between conductors and ground of the completed installation shall not be less than 1 meg ohm.

2.12.2 Conductors: Furnish and install all wires and cables necessary for the proper connection and operation of all equipment installed under the elevator contract. All conductors, including control board wiring, shall be in accordance with NFPA 70 NEC requirements.

- a. Unless otherwise specified, conductors exclusive of traveling cables shall be stranded or solid annealed copper with 75 degrees C or better insulation. Single and multiple conductor cables shall have a color coding or other suitable identification for each conductor. Unless otherwise specified, no joints or splices will be permitted in wiring except at outlets. Tap connections may be used in raceways provided they meet all NFPA 70 NEC requirements.
- b. Terminal connections for all conductors, used for external wiring between the various items of elevator equipment, shall be solder less pressure wire connectors, in accordance with NEC Standards or another approved testing laboratory. Connections for wire size No. 10 or smaller shall be of the crimp

type applied with an appropriate setting tool.

- c. Terminal blocks having pressure wire connectors of the clamp type that meet UL or CSA or another approved testing laboratory requirements for stranded wire may be used in lieu of terminal eyelet connections. Terminal blocks using pierce-through serrated washers will not be acceptable.
- 2.12.3 Run wiring from each operating switch, safety switch, and control device to terminal strips at the controller, such as to permit easy testing and trouble-shooting. Make no splices. Mark each wire with a numbered adhesive waterproof marker, and mark each group of wires as to destination with waterproof markers. Color code all wires in multi-wire cables. Mark intermediate terminal blocks with corresponding numbers on waterproof labels. Provide waterproof, neat, legible lists showing all wiring runs, color codes and numbers codes. Attach the lists to the controller.
- 2.12.4 Car Exterior Working Light Circuit: Install car top and car bottom work lights and ground fault duplex plug receptacles. Provide permanently wired auxiliary extension light cord on each car top with a 6" minimum extension cord.
- 2.12.5 Traveling Cables: Provide new traveling cables to meet the conductor requirement as identified below. The cables shall be capable of bending 360 degrees with an inside covering. The open loop shall show no tendency to twist upon itself. Suspend traveling cables with non-metallic fillers by looping cable around supports. Install shields and pads necessary to prevent chafing. The loop in the traveling cables shall be not less than 2' unless otherwise approved. Traveling cables shall be of the highest grade stranded, flexible, fire retardant and Type ETT cables with thermoplastic jacket and shall connect from a junction box under or on top of the car to a hatch junction box mounted at a rear corner of the hoistway. Traveling cables shall be in accordance with the requirements of the NFPA 70 NEC Article 620. The traveling cables shall be run in duct or conduits no more than 6' from the first point of car support contact. Running travelling cable up the side of the car and securing them with plastic wire ties to the car brace rods, side styles or cross head shall not be permitted. Also running traveling cables unprotected on the car top shall not be permitted. The junction boxes shall be equipped with terminal blocks with identifying numbers for each connection. The cables shall be anchored to avoid strain on the terminal connections. Cables shall be free from contact with hoistway structure, car, counterweight or other hoistway equipment. Each traveling cable shall have spare conductors, in a number not less than 20% of the active conductors, but not less than two spare conductors. All traveling cables shall have the same diameter. Each traveling cable conductor shall have a distinctive color coded outer covering for identification. Terminal blocks shall have indelible identification numbers for each terminal connection. Hoistway junction boxes shall be mounted at a rear corner of the hoistway unless otherwise approved. Provide the following conductors:
- a. Shielded conductors sufficient for elevator signal communications between the car and the machine room and devices.

- b. At least six (6) shielded twisted pairs of conductors for the security system, four (4) shielded twisted pairs of conductors for the in car full duplex speaker phone emergency communication system and six (6) shielded twisted pairs of conductors for the Owner's future use. The minimum conductor wire gauge for the above shielded twisted pairs is 18 gauge.
- c. Two pair of 12 gauge wires for two (2) 110 VAC 15 Amp circuits to the car.
- d. Provide four (4) RG 6 with 20 gauge minimum coaxial cables per car for high frequency signal transmission.
- e. The security contractor shall use coaxial cable RG 6 with 20 gauge conductor for the in car TV camera. If in fact the security contractor wants to install TV cameras with Cat connectors then the security contractor shall install machine room and car top conversion boxes.
- f. In each hoistway provide traveling cables of equal diameter, flexibility and numbers of conductors.
- g. If complete freedom from contact with the hoistway construction cannot be avoided, due to sway or position, suitable shields or pads shall be provided to prevent chafing or damage to the traveling cables.

2.12.6 Emergency Communication System Wiring: Provide and install wiring, conduit and terminal strip boxes within each elevator cab.

- a. Provide shielded twisted pairs of conductors for the communication speaker that shall be installed in the auxiliary car station in the car enclosure.
- b. Provide shielded twisted pairs of conductors for communication speaker in conduit from the traveling cable, locate under the car platform or in the operating panel, to a terminal strip box located on the elevator car top. Conductors and shields shall be labeled and connected to the terminal strips for connection to the emergency telephone and communication speaker.
- c. Traveling cable conductors for the communication speaker shall be run from the machine room elevator controller in conduit to a terminal strip in a junction box located on the machine room wall. Conductors and shields shall be labeled and connected to terminal strips for connection to the building system.
- d. Terminal boxes with terminal strips shall be identified by a red cover and a permanently attached laminated label that reads "Emergency Communication System".

2.13 **CONDUIT**

2.13.1 Unless otherwise specified or approved, all electrical conductors including low voltage conductors, except traveling cable connections to the car, shall be installed in conduit or metal raceways in accordance with the NFPA 70 NEC. Exposed hoistway wiring of any type is prohibited.

2.14.2 All conduits terminating in steel cabinets, junction boxes, raceways, switches, outlet boxes and similar locations shall have threaded connectors with a steel lock nut located on each side of the terminating material and threaded steel or threaded insulated bushings installed at the end of the fitting thread. Inserted after the fact slip in plastic cone type insulated bushings shall not be accepted.

2.14.3 At ends of conduits not terminating in steel cabinets or boxes the conductors shall be protected by terminal fittings having an insulated bushing to protect opening for the conductors.

2.14.4 Couplings and connectors for EMT shall be made either of steel or malleable iron only, shall be either the gland and ring compression type or the stainless steel multiple point locking type. All connectors shall have insulated throats. Conduit and EMT fittings and connections using indentations as a means of attachment shall not be used.

2.14.5 All conduits connecting the various items of elevator equipment in the elevator machine room shall be run in concealed positions insofar as practicable. Metal raceways shall be run exposed in readily accessible locations. Such raceways shall be routed in a manner which does not infringe upon minimum vertical or horizontal clearances imposed by applicable Codes and which will not impede the utilization of any existing trolley-hoist systems to move equipment or components from the machine rooms to trap or access doors.

2.14.6 All raceways completely embedded in concrete slabs or floor fill shall be rigid steel conduit. Raceway terminal fittings must provide conductor passageways free from burrs, shoulders or other projections that will reduce internal passage area or cause abrasion of conductors being pulled through. Provide rubber edge material on all internal edges.

2.14.7 Terminal boxes shall be provided for the conduit and wiring connections to all motors.

2.15 **CAR AND COUNTERWEIGHT FRAMES**

2.15.1 Car and Counterweight Frame: Retain and re-use both the car and counterweight frames. Except the car sling shall be provided with new longer side styles to accommodate 10" cabs.

- 2.15.2 Guide Shoes: Provide new ELSCO Model B car roller guides on the car top and bottom. Provide seismic plates under the car top roller guide assemblies. Provide new ELSCO Model D counterweight roller guide assemblies on the top and bottom of the counterweight frame. Provide seismic plates under all counterweight roller guide assemblies.
- 2.15.3 Car and Counterweight Static Balance:
- a. Statically balance the car and counterweight frames so that at the center of hoistway travel, with car top roller guides backed off that the car and counterweight side styles shall hang centered of the main rails.
 - b. Balance the car and counterweight frames so that in this position and with the roller guides adjusted, there is equal pressure on all roller guides.
 - c. Adjust the roller guides so that at any point in the travel, the pressure of each roller on the running surfaces of the rails shall be between 25 and 50 pounds. Adjust the rollers for equal pressure on the running surfaces of the rail.
- 2.15.4 Car Safety Devices: The existing car safeties shall be totally dismantled and clean to remove any rust and dirt contaminates. Any worn or damaged parts shall be replaced. After total cleaning and re-assembly of the car safeties lubricate all pivot points and adjust in accordance with manufacturer's calibration recommendations.
- 2.15.5 Governor: The existing car governor shall be totally solvent cleaned to remove any grease, dirt and rust contaminates. After total cleaning and lubrication of all pivot points calibrate the governor with the use of an analog tachometer to verify that both the electrical and mechanical tripping speeds are set in accordance with the governor data plate and in accordance ASME A17.1 requirements. This calibration shall be performed by removing the governor rope and spinning the governor sheave with a variable speed drill motor while calibrating both the electrical and mechanical settings. After governor has been totally recalibration install a new lead seals on the adjustment points.
- a. Hoisting and Governor Ropes: ASME A17.1 Section 2.18.5. Provide six (6) new 5/8" Seale non preformed standard traction wire ropes. The hoist wire ropes shall be 8 x 19 non preformed standard Seale pre-stretched steel traction with a fiber core. Use 1/32" iron seizing wire as related in the "Elevator installation Manual", the use of cable bands or nylon tape in lieu of seizing wire is prohibited. Provide new car and counterweight 5/8" Babbitt shackle rods designed to permit adjustment of the rope length. All cable shackles at each end shall be tied together with 3/8" steel cable to prevent rotating. The hoist ropes used for this project shall be manufactured by Williamsport Wire Rope Williamsport, PA.
 - b. Provide a new governor rope 1/2" 8 x 19 with flexible iron traction construction with lubricated fiber core. Ropes shall be free of kinks and displaced or broken wires. Provide sheet metal and angle iron guards to protect personnel from

accidental contact with the ropes in the machine room.

- c. Rope Tension Springs: Provide all new shackle springs on the counterweight end of the hoist rope shackles on all cars which shall be roped 1:1.

2.15.6 Compensation: Provide new whisper flex chain compensation with pit mounted sheave.

- a. The chain compensation shall balance the weight of the hoisting ropes and unbalanced portion of traveling cables.
- b. With a 42.5% car capacity the compensation chains shall have adequate compensation so they are balanced within 200 pounds at any point in the hoistway. This shall be verified during final turn over inspection.
- c. Solid State Control with Integral Compensation. Provide solid state control to provide electrical compensation with 1:1 roping.

2.16 **CAR DOOR OPERATOR AND HOISTWAY DOOR ACCESSORIES**

2.16.1 Provide new GAL MOVFR Door Operator with control door arms for a 10' high cab with 84" center opening car and landing doors.

- a. Opening and Closing of Car Doors: Car doors shall be 75% open when the car has completed the leveling operation. The doors shall close after an adjustable predetermined time, unless a "DOOR CLOSE" or "CAR CALL" push button is pulsed or the door protective field is broken to reduce the respective dwell time during door opening. A pulsation on a landing hall call push button at the floor where the car is standing with its doors closed shall result in the doors opening. The doors may be reopened from within the car by pulsing the "DOOR OPEN" push button.
- b. Hoistway Door Interlocks and Car Door Contact: Replace all the stationary and moving contacts for the landing door interlocks. Replace all the landing door clutch and bell crank rollers. Replace all landing door sheaves and up-thrust rollers. Replace all landing door gibs. Replace all door operator arm bushings and bearings. Replace all car door sheaves and up-thrust rollers. Replace car door gibs on new stainless steel car doors. Replace the car door gate switch with a new Otis car door gate switch. Tighten all door relating cables that are rusty or require replacement and tension accordingly. After completion of all the hoistway car and landing door sheaves and rollers and the refurbishment of the door operator re-adjust to an as new condition and re-calibrate the door operator.
- c. Door Protective Field: Provide a new solid state Pana 40 Plus 3 D door

protective field on the leading exterior edge of the car door panels (Center Opening). This door protective field shall extend the full height and width of the car door opening. Arrange the protective field so that it shall detect a person or an obstruction while the doors are closing upon which it shall automatically cause both the car and the hoistway doors to stop and return to their open position. Doors shall close immediately after the protective field is re-established. The breakage of the protective field during the door opening cycle shall reduce the car and hall dwell time as outlined above.

- d. Nudging Operation: The protective door field device shall be so designed that it will become inoperative after a prolonged period of interruption of the protective field or with continuous pressure on a car door open push button beyond a predetermined time interval. In either case, at the end of the predetermined manufacturer's standard adjustable time interval, from fifteen to thirty seconds, the doors shall begin to close at reduced (nudging) speed in conformance with the requirements of ASME A17.1 and a buzzer shall sound while the doors are closing at a reduced speed.

2.17 **CAR PLATFORMS AND ENCLOSURES**

2.17.1 Passenger Car Platforms. Retain the existing steel stringer platform and steel sub frame. Remove all the rust and dirt contaminates from both the platform sub frame and the car platform with the use of a wire brushes and paint with a rust preventative paint. Replace the steel shell cab. Provide all new rubber platform isolation pads. Replace the existing car platform sill with a new Nickel Silver car sill with concealed fasteners. Replace the current 28" high car toe guards with new 40" high toe guards (Verify code clearance with new 40" high toe guard - provide maximum height to 48" if doable.) with a metal fascia (apron) of not less than 14 gauge steel. Provide a toeguard that is 2" wider than the entrance opening (36") on each side and have a vertical length not less than 40". Remove existing flooring and provide new finish flooring with a single piece 12 gauge sheet metal fastened with countersunk flat head countersunk wood screws at 12" maximum centers..

2.17.2 Passenger Car Enclosures: Remove the existing 8' 0" steel shell and cab walls complete. Provide new 10' 0" steel shell and cab interior as shown on Architectural drawing A106. Two (2) of the six (6) LED Down lights over the main and auxiliary car station shall be illuminated by an on board battery pack during a normal car lighting failure. Also provide a removable suspended ceiling panel directly below the emergency exit for car evacuation. These cars shall have the following design characteristics as modified by the final architectural cab drawings:

- a. Ceiling: Provide suspended ceiling with No. 4 brushed stainless steel finish with 6 down lights. The bottom of this suspended ceiling shall be located no greater than 6" below the dome as approved by the architect.
- b. Car Entrance Frame: Provide new 14 gauge minimum stainless steel with # 4

brushed stainless steel as related on the architectural drawings.

- c. Return Panels: Provide new 14 gauge minimum stainless with # 4 brushed stainless steel as related on the architectural drawings. The main and auxiliary car stations maybe recessed in fixed return panels with a continuous piano hinge their full length with hair line perimeter margins using an Allen wrench for gaining access to the rear of the car operating panels.
- d. Transom: Provide 14 gauge minimum stainless steel with # 4 brushed stainless steel finish running full width of the cab. Within this new stainless steel header shall be installed a new combination digital position and directional arrows without a cover plate.
- f. All stainless steel utilized within the *passenger* cab interiors including car doors, return panels, headers, fixture cover plates, base molding, pad buttons etc. shall be # 4 brushed stainless steel # 14 gauge.
- g. Handrails: If handrails are required by the Architect they shall be 1-1/2" in diameter cylindrical # 4 brushed stainless steel handrails with welded end caps that are ground smooth. Space handrails 1-1/2" from the three (3) cab perimeter sidewalls. Mount handrails so that the top of the handrail is located 32" above finished floor.
- j. Passenger Car Floor Coverings: Remove existing cab flooring and provide flooring material as selected by the architect (By Others).
- k. Cab Heights (all cars): Replace 7' 11" cab with 10' 0" cab
- l. Interior Ceiling Height to suspended ceiling. Replace 7' 7" with 9' 6".
- n. No trade marks or manufacturers' nameplates visible to the general public shall appear on any piece of equipment.
- o. Apply tape between abutting joints of steel shell and the new return panels and header to prevent squeaks, prior to assembly.
- p. Car Entrance Frame: Provide 14 gauge minimum stainless steel with # 4 brushed finish.

2.17.3 Side Style Replacement: Provide new structural steel car sling side styles of a cross sectional modulus equal to or greater than the existing. These new side styles shall replace the existing side styles to allow for new 10' cabs to replace the existing 8' cabs. The safety and cross head drill pattern in these new car side styles shall be identical to the existing.

2.18 **CAR COMPONENTS**

- 2.18.1 Car Doors: Provide new stainless steel center opening door panels for all cars. Provide 36" wide X 7' 0" high center parting doors. The car doors shall be of the same and size type as the hoistway doors. Equip car doors with a protective field on the leading edge of each door panel (for single speed center opening). Cars door panels shall be # 4 brushed stainless steel for all passenger cars with a surface gauge not less than # 16. The car door panels shall be of solid configuration with front and rear steel surfaces. Car doors with only a front surface only shall not be accepted. New car door GAL hanger tracks shall be provided. Provide new door gibs on each door panel. Gibs shall be replaceable without removing door from hanger rail.
- 2.18.2 Car Emergency Lighting Power Package: The cars shall be equipped with an emergency car lighting system consisting of a rechargeable battery, charger, lamp and controlling relay, arranged and connected so as to automatically provide emergency battery powered lighting in the event of car lighting service failure, regardless of the position of the normal car light switch. The battery and relay shall be mounted on top of the cab and housed in a sheet steel box with hinged cover and latch. The relay shall be designed for continuous duty service on electric current available for car lighting. The emergency light shall be the activation of two (2) of the normal car down light above the main car station. These light beams shall be directed toward the main car opening panel. The fixture shall provide adequate illumination to permit the use of the in car communication system and to distinguish the various components on the car operating panel. Shop drawings of the emergency lighting system and components to be furnished shall be submitted to the Architect/Owner for approval. The emergency lighting system shall become active within five (5) seconds and supply power to enough lighting elements to provide 2' candles of illumination at the car floor for four (4) hours. Provide each fixture with an AC circuit power that shall have the capacity to operate the alarm bell for one hour and shall also be provided with a readily accessible means of testing within the car station. Provide key operated emergency light test switch in the car service panel that shall remove all power from normal car lighting. This wiring logic is the only way to truly test the emergency lighting system. Simply testing the emergency power battery pack with a car panel mounted switch is not acceptable. The emergency lighting assembly shall have a audible signal in the event that the emergency power source or its bulbs are non functional.
- 2.18.3 Ventilation: Provide new three (3) speed centrifugal exhaust ventilation fan "Model AA" as produced by Morrison Products, Inc. on all cars. Exhaust blower shall be mounted on the car top. Provide neat appearing screen grilles in car tops and mount fans on vibration absorbing rubber isolation material. Provide a screen grille on the exhaust portion of each fan. Provide concealed inlet vent slots under and behind the bottom edge of the hang on car interior side panels on all passenger cars. Plug the current exhaust fan dome penetrating holes and cut two (2) rectangular holes for the new Morrison fan. The blower shall have three operating speeds with a rated free delivery air displacement of approximately 1,000 C.F.M. on high speed, 640 on medium speed and 480 C.F.M. on low speed. The unit design and installation shall be such that the maximum noise level when operating at high speed shall not exceed 5 decibels from a reading approximately 5" above the car floor. Provide a four (4) position key operated

switch (off, low, med, high) in the main car panel or access panel to control this fan.

- 2.18.4 Pads and Buttons: Provide stainless steel wall mounted pad buttons above the suspended ceiling line. These pads shall cover side and rear walls and return panels. The pad buttons shall be spaced at a minimum of 16" centers at the most inconspicuous locations as possible. Cab pads shall be fabricated of fire retardant automotive quality vinyl covers over 1/4" fire-resistant polypropylene. The pads shall be stitched throughout with nylon thread and have reinforced edges. Heavy 5/8" inside diameter spur grommets shall be provided at the top portion of the cab pads at 16" centers minimum. Provide one (1) set of protective pads for cars 1-3. Submit samples for approval and test data to verify compliance with ASME A17.1
- 2.18.5 Cab Steadier Plates: Provide new roller type car top steadier plates on cars 1-3. These steady plates shall have three (3) rollers, one riding on each flange of each side style.
- 2.18.6 Emergency Exit: Provide new car top emergency exit on all cars. Provide a hinged exit with the cover that opens outward, shall be unobstructed when opened, shall have a mechanical stop other than the chain stop and shall be so arranged that it can open only from the car top without the use of special tools. Equip the exit with a non-self resetting contact if not existing which shall prevent the contact from re-setting unless the exit panel is fully closed and a manual re-set is performed. Provide a removable section in the suspended ceiling with hair line seams identical in size and location as the car top emergency exit that shall be hinged, removable or rotated above the suspended ceiling so that easy and clear access can be achieved to the car top emergency exist panel.

2.19 **HOISTWAY DOORS AND ENTRANCE FRAMES**

- 2.19.1 General: Replace all landing door panels with new with prime finish of a color as selected by the architect. Retain and re-finish (by others) all entrance frames. The entrance frames shall be thoroughly cleaned of all rust, oil, grease and dirt by solvent of metal acid etch and shall be sanded to realize a smooth surface and then both the landing entrances and new landing door panels shall be immediately given a coat of approved rust inhibiting paint of a color as selected by the Architect. The landing door panels and entrance frame painting shall include the landing door sight guards at each floor.
- 2.19.2 Horizontally Sliding Hoistway Doors: Horizontal single speed sliding doors shall be replaced with new on cars 1 - 3. Entrance frames and new landing door panels shall be painted "by others".
- a. Hoistway Entrance Frames: Retain, refinish and re-paint (By others).
 - d. Hoistway Entrance Sills: Retain and re-use.
 - e. Hoistway Entrance Doors: Replace with new with prime finish and apply final finish paint with electrostatic application except at the ground floor where # 4

brushed stainless steel shall be provided. (By others).

- f. Hoistway Door Hangers: Replace with new GAL hangers and related hardware.
- g. Landing Door Hardware: Provide all new GAL landing door hardware including MOCPH landing door interlock assembly and clutch roller assembly.
- h. Door Closures: Provide either gravity weighted closures or Track Master Spirators.
- g. Hanger Covers: Retain, re-install and provide new if missing.
- h. Dust Cover: Provide a new full length permanent dust cover over the top floor entrance header.
- i. Field Painting: Dust covers, hanger covers, fascia and car and hoistway toe guards shall be cleaned and field painted in accordance with a color as specified by the Architect.
- j. Finishes: Doors and frames shall be re-finished with a color as selected by the Architect.
- k. Hanger track support (Header): Retain.

2.20 **EMERGENCY POWER OPERATION**

2.20.1 Power requirements are specified per Division _____ including power transfer and absorption of regenerated power. Verify that the total regeneration power of one fully loaded car traveling in the down direction shall not in total not exceed the maximum regenerative power capability of the emergency power generator. Assume minimum 3/4 regenerative power of full load up current and voltage. Provide all circuitry and wiring necessary to accomplish the following sequence of operations upon the outage of normal power and the initiation of emergency power. All elevators at the same time shall stop and one elevator at a time shall start and return automatically non-stop to the ground floor. After all cars have returned to the ground floor one car in the group shall then return to an automatic operation under emergency power conditions. If for any reason the selected car within a group fails to operate, automatic operation shall be transferred sequentially to the remaining car(s) in the group. Car 1 shall be the designated as the emergency power car. Upon restoration of normal power, all elevators that were available for service prior to the power failure shall automatically resume normal service in sequential starting.

2.20.2 In addition to the automatic emergency power transfer logic as referenced above provide "a manual emergency power selector switch" and related signal light marked "Elevator Emergency Power" fixture assembly with a similar cover plate as referenced

for the hall call push buttons at the ground floor for elevators 1 - 3. In the "automatic" position under emergency power the car identified shall return to the ground floor and open and close its doors and shut down. In the "manual on" position this car shall return to service under emergency power conditions.

2.21 **PROVISION FOR HANDICAPPED *BARRIER FREE ACCESS***

2.21.1 Code of Federal Regulations 28 CFR Part 36, ICC/ANSI A117.1 2008 with the additional requirement of Braille symbols for the visually impaired.

- a. Car Control Operating Button and Switch Designations: Provide 0.30" raised standard alphabet characters for letters, Arabic characters for numerals or standard symbols as produced by Stencil Cutting Supply Company Model CW1/CW2 flush mounted as required by ASME A17.1 Place the Braille 1.5875 cm (5/8") high symbols corresponding to the numerals or letters on the elevator buttons located immediately to the left thereof. Alternatively, place the Braille symbols directly below the Arabic numerals. Identify other controls and emergency equipment by raised symbols, including open door, close door, emergency alarm, emergency bell, emergency stop and emergency communication. Submit fixture drawings to architect for approval prior to fabrication.
- b. Designations for Hoistway Entrances, Landing Call Buttons and Landing Lanterns: Provide new floor designations on each entrance side of each entrance frame visible from within the car and the elevator lobby. The centerline of the letter or numeral designation of these indicators shall be 60" to center line above finished floor. Designations shall be raised 0.03" on a contrasting color background and not less than 2" in height. Provide Model *CJT24* Door Jamb Plates as produced by Stencil Cutting Supply Company with Braille Symbols to the left of the corresponding floor designations whose centerline shall be in line with the centerline of the adjacent floor designation. Applied plates containing Braille symbols or and floor designations are acceptable if they are permanently fixed to the door jambs, submit a sample and fastening method for approval. Locate landing call buttons so that the horizontal centerline between the buttons is 42" above finish floor. The button designating the "Up" direction shall be on top. Provide mechanically fastened Braille symbols directly to the left of these call buttons indicating direction (CW1/CW2 with directional arrows and Braille). Objects mounted beneath landing call buttons shall not project into the elevator landing more than 4". The visual signal for each direction shall be an illuminating 2-1/2" minimum high LED darkened lens visible from the proximity of the landing call buttons. Use LED color arrows to indicate the direction of next travel; green for "Up" red and for "Down" as approved by architect. The audible signal shall sound once for the "Up" direction and twice for the "Down" direction.
- d. Provide 3" high elevator designation numbers at the ground floor at the top of

each elevator entrance as required for emergency personnel.

PART 3 EXECUTION

3.1 COMPLIANCE

3.1.1 When the elevator work included in the Contract is fully complete, the Contractor shall notify the Owner in writing ten (10) calendar days prior to the inspection date that the elevator or elevators are ready for a final inspection and acceptance testing. The Contractor shall co-ordinate with the local inspecting authority for inspection dates of the elevator equipment. The Contractor shall secure and pay for all permits and inspection fees required. The Owner, in conjunction with the local inspecting authority, shall inspect the installation. The Contractor shall perform all tests and demonstrate the proper operation of all parts and provisions of the equipment and shall prove to the satisfaction of the Owner and the elevator inspector that the elevator, as installed, complies with the requirements of this Contract and all applicable testing requirements of ASME A17.1. Inspection procedures outlined in ASME A17.1 Section 8.10 shall form a part of the final inspection. Elevator Contractor shall demonstrate that performance as required under the Paragraph "Performance" is provided. The Contractor shall co-ordinate with the local inspecting authority for an inspection of each unit upon completion. The Contractor shall also co-ordinate with the Owner for their inspection. Duplication of areas of testing will not be required.

- a. Follow Up Inspection: There shall be one inspection and one follow up re-inspection. The Contractor shall be responsible for the cost incurred by the Owner for the requirement of more than one re-inspection that may be required as a result of not being 100% complete with deficiency list related items. The cost of such inspections shall be inclusive of airfare, hotel accommodations, daily expenses where applicable and the inspecting agents time.
- b. Testing Materials and Instruments: Furnish all test instruments and material required for final inspection. Include standard 50 lb test weights, insulation "Megger" 600 volt, alternating current voltmeter and ammeter, direct and AC current voltmeters and ammeters, Celsius calibrated thermometers, light meter, spirit level, stop watch and a digital and analog tachometers.
- c. Data and Test Records not to be submitted: Shop test and certified test sheets for elevator motors are not required. The heating, insulation resistance and other characteristics of the motors shall be determined under actual field measurement conditions after installation.

3.1.2 Final Inspection: In addition to any other tests, make the following tests at the time of final inspection:

- a. Speed Load Test: Determine the actual speed of the elevator car, in both directions of travel, with the rated load and with no load in the elevator car. Make speed tests before the rated load test run and also after the rated load test run. Determine speed by applying an analog tachometer to the car drive sheave. The actual measured speed of elevator car with rated load in the "Up" direction shall be contract speed. The maximum difference in actual measured speeds obtained under the various conditions outlined shall not exceed 3% of the total difference between the "Up" and the "Down" speeds. Check floor-to-floor and cycle time in "Up" and "Down" directions.
- b. Car Leveling Test: Test elevator car leveling devices for accuracy of landing at all floors with no load in car, symmetrical load in car and with the rated load in car, in both directions of travel. Determine accuracy of floor landing both before and after the rated full load run test. The leveling accuracy of the car and landing sill shall not exceed 1/4".
- c. Brake Test: Conduct brake test with the rated full load in the car. Run car down from the top floor with 125% rated capacity load and stop at any floor including the bottom terminal floor. The car shall stop, doors shall open, and the brake shall set holding the car at that floor without overshooting or re-leveling. Each brake pad shall be capable of holding the car at the floor with 125% overload condition.
- d. Insulation Resistance Tests: The complete wiring systems of the elevator shall be free from short circuits and grounds and the insulation resistance shall be determined by use of a "Megger". Conductors shall have an insulation resistance of not less than one megohm between each conductor and ground and between each conductor and all other conductors.
- e. Buffer Tests: Test buffers for car and counterweight as outlined in ASME A17.1 Section 8.10.2.2.5 (c).
- f. Temperature Rise Tests: All motors, choke coils and isolation transformers shall be tested to demonstrate that the temperature rise under normal operating conditions encountered in the building will not exceed a 50 degrees C. above ambient when measured with a thermometer or pyrometer. Tests shall commence with each type elevator having been turned off for a minimum time period of four (4) hours. This time period is required in order to realize ambient temperature of the equipment to be tested. Tests shall be performed with full and empty capacity load in the car. These full and empty load tests shall be made until constant temperatures are reached on all such pieces of equipment. In making these tests, the car shall stop at each landing in each direction of travel for a time period of not less than 5 nor more than 10 seconds to realize 240 starts per hour. Other test conditions shall be conducted as specified in the latest procedure of the Institute of Electrical and Electronic Engineers (IEEE std 113-2000) for heat runs on D.C. Motors and MG 1 -2000 Section 18.436. During the heat test the machine ambient room temperature shall remain under

95 degrees F.

- g. Certification: In addition to the tests required by ASME A17.1 the Contractor shall provide evidence of certification by a public authority of competent jurisdiction for the project area, stating that each governor and car safety has been tested and approved for use with equipment having the specific ratings indicated or specified. Include the following data on a plate attached to each safety:
 - 1. Manufacturer's name.
 - 2. Model and type designation.
 - 3. Maximum tripping speed in feet per minute.
 - 4. Maximum gross load, in kgs, which the safety is designed to stop and sustain as installed.
 - 5. The date of the safety test, made during the elevator inspection and acceptance tests witnessed by a Certified Elevator Inspector, his name and certificate number.
- h. Balance Test: Demonstrate with an AC ammeter connected in the three (3) phase input to the drive motor to verify that the cars are balanced precisely at 42.5% for gearless cars 1 - 3. Lifting the mechanical brake at the midpoint in the hoistway with both the car and counterweight crossheads at the same vertical elevation and pulling on the drive sheave in each direction shall also be performed as a secondary verification to confirm car balance percentile.
- i. Failure Tests:
- j. Normal Terminal Stopping Device: Demonstrate that the Normal Terminal Stopping Device functions properly with both the Normal Stopping Device and the Normal Tracking Device disabled. This test shall be performed with a full load in the car in the down direction and an empty car in the up direction. The device shall so function that the car shall slow down and stop at the terminal floors so that passengers can exit the car. High speed stops and passenger entrapments outside the leveling zone shall not be accepted.
- k. Emergency In Car Stop Switch: Upon activation of the in car emergency stop switch, power shall be removed immediately from the driving machine motor and brake. Systems where controlled emergency stops are realized shall be rejected.
- l. Hoist Rope Shackle Sequence: Verify that each car hoist rope shackle on each end is properly sequenced at their fastening points.

3.1.3 Payment Schedule: The below listing represents the payment schedule which will be applicable to this project:

Payment Percentage	Area
10%	Engineering cost with contract award.
45%	Material delivered to job or stored off site.
35%	With monthly labor payment certification.
10%	Upon total 100% completion of every state and consultant deficiency item.

3.1.4 After total completion each elevator including all final adjustments, testing, and deficiency list corrections a complete elevator equipment cleaning shall be performed prior to the owner's acceptance. These activities shall include the following:

1. Vacuum all dirt and dust from the drive and control cabinets.
2. Vacuum all dirt and dust from isolation transformer cabinet.
3. Vacuum dirt and dust from the drive motors and the machines.
4. Vacuum the machine room floor and paint.
5. Vacuum the dirt and dust from every hoistway header and landing sill.
6. Vacuum all hoistway ledges including divider beams.
7. Vacuum the entire pit area including pit elevator equipment and paint the floor.
8. Vacuum all car top equipment and also the interior of each swing return panels in the car.
9. Vacuum all dirt and debris from car safeties.

3.2 TEMPORARY USE AND PROTECTION

3.2.1 At time of substantial completion of elevator work (or portion thereof), provide suitable protective coverings, barriers, devices, signs or such other methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout the remainder of the construction period. Install safety enclosures, signs and devices to prevent accidental injury or damage to the equipment. At completion of temporary use, restore elevator work to original condition, without damage or deterioration.

3.2.2 Provide an hourly rate quotation for both straight and overtime for an elevator mechanic to operate an elevator during the construction period for "Work by others".

3.2.3 Elevators shall not be used for construction purposes, prior to turning over to the Owner, except with written authorization from Owner. If Owner authorizes temporary use of elevators, the following conditions shall apply:

1. Contractor shall provide a "Temporary Acceptance Form" for user to sign.
2. Neither the new installation period nor the warranty period shall start without Owner's written approval.
3. The elevator contractor shall provide all temporary enclosures, guards or other protection of hoistway openings, signal devices, car lights, elevator entrances, fixtures, and any other equipment installed.
4. The elevator contractor shall return elevators in the condition that existed when Owner approved the "temporary use".
 1. User shall pay Contractor for all repairs, clean-up and re-adjustment required.
5. User shall allow Contractor to perform routine maintenance and repairs.

3.2.4 As elevators are completed, Owner shall have the prerogative of accepting and using elevators, shutting down the elevators or accepting the elevators under an "Interim Service Agreement" described below:

1. Owner shall have the prerogative of continuing the "Interim Service Agreement" until all elevators in the group (or building) are complete.
2. Warranty period and new installation service if applicable shall start at the termination of "Interim Service Period".
3. Cost of interim service shall not exceed the prorated cost of maintenance agreement required in this section.

3.3 **TOOLS**

3.3.1 Three (3) sets of tools shall be furnished in an appropriate metal tool box and delivered to the Owner. The set shall consist of all special tools required for making adjustments on those parts of the elevator installation requiring the use of special tools or wrenches. Provide the full diagnostic tool required to fully adjust both the signal and speed control of the system. A high-pressure grease gun of ample size to suit grease gun connections shall be provided with each set of tools. Any special or over size tools required to adjust brakes and other equipment shall also be supplied.

END OF SECTION

SECTION 230010 - GENERAL PROVISIONS - HVAC

PART 1 - GENERAL

SCOPE:

Bids of work covered by each section of these specifications shall be based on the layout and equipment as shown and specified with only such approved substitutions as are allowed. Drawings show general arrangement of ductwork and piping. Because of small scale of drawings, it is not possible to indicate all offsets, fittings, and accessories, which may be required. Contractor shall carefully investigate structural and finish conditions affecting his work and shall arrange such work accordingly, furnishing such fittings, traps, valves, and accessories as may be required to meet such conditions. Where locations make it necessary or desirable from Contractor's standpoint to make changes in arrangements or details shown on drawings, he may present suggestions for such changes and obtain Engineer's approval prior to making such changes.

CODES:

All work under this division shall be in strict compliance with "2009 International Codes" and all applicable Codes and Regulations of the State of South Carolina.

MATERIAL AND SHOP DRAWINGS:

Use only new materials and the standard product of a single manufacturer for each article of its type unless specifically mentioned otherwise. Materials and workmanship in the case of assembled items shall conform to the latest applicable requirements of NFPA, ASME, NEC, ASTM, AWWA, NEMA, and ANSI.

Schedule submittals to expedite work. Unless otherwise indicated in this Section, submittals shall be submitted within 30 days of date of Notice to Proceed. Provide six (6) copies of submittals for review and approval. Provide folders or binders for each submittal. All submittals shall be bound in a single volume. Partial lists will not be considered and will be returned to the Contractor. Controls may be submitted separately and shall be submitted no later than 60 days of notice to proceed. Identify Project, Contractor, subcontractor, supplier, manufacturer, pertinent drawing sheet and detail numbers, and associated specification section numbers. A table of contents shall be included in the front of the submittal with tabs indicating each section. Identify variations from requirements of Contract Documents.

Contractor responsibilities:

Review submittals prior to transmittal. Verify compatibility with field conditions and dimensions, product selections and designations, quantities, and conformance of submittal with requirements of Contract Documents. Return non-conforming submittals to preparer for revision rather than submitting to Engineer. Coordinate submittals to avoid conflicts between various items of work. Failure of Contractor to review submittals prior to transmittal to Engineer shall be cause for rejection. Incomplete, improperly packaged, and submittals from sources other than Contractor will not be accepted. Submittals not stamped APPROVED and signed by the Contractor will be returned to the Contractor.

Where required by specifications or otherwise needed, prepare drawings illustrating portion of work for use in fabricating, interfacing with other work, and installing products. Prepare 1/4" per foot scale drawings of all mechanical rooms when substituting items of equipment that are not the basis for design. All equipment submitted shall be of adequate size and physical arrangement to allow unobstructed access when installed, for routine maintenance, coil removal, shaft removal, motor removal and other similar operations. Contract Drawings shall not be reproduced and submitted as shop drawings. Drawings shall be 8-1/2 by 11 inches minimum and 24 by 36 inches maximum. Title each drawing with Project name and reference the sheet the drawing corresponds to.

Provide product data such as manufacturer's brochures, catalog pages, illustrations, diagrams, tables, performance charts, and other material which describe appearance, size, attributes, code and standard compliance, ratings, and other product characteristics. Provide all critical information such as reference standards, performance characteristics, capacities, power requirements, wiring and piping diagrams, controls, component parts, finishes, dimensions, and required clearances. Submit only data which are pertinent. Mark each copy of manufacturer's standard printed data to identify products, models, options, and other data pertinent to project.

Control diagrams: Show relative positions of each component as a system diagram. Provide points list, wiring diagram and schedule of all products and components used in system.

Engineer will review and return submittals with comments. Do not fabricate products or begin work which requires submittals until return of submittal with Engineer acceptance. Promptly report any inability to comply with provisions. Revise and resubmit submittals as required within 15 days of return from Engineer. Make re-submittals under procedures specified for initial submittals. Identify all changes made since previous submittal.

Engineer Review:

Engineer will review submittals for sole purpose of verifying general conformance with design concept and general compliance with Contract Documents. Approval of submittal by Engineer does not relieve Contractor of responsibility for correcting errors which may exist in submittal or from meeting requirements of Contract Documents. After review, Engineer will return submittals marked as follows to indicate action taken:

- No Exception: Part of work covered by submittal may proceed provided it complies with requirements of Contract Documents. Final acceptance will depend upon that compliance. The term "approved" shall only indicate that there is no exception taken to the submittal.
- No Exception As Corrected: Part of work covered by submittal may proceed provided it complies with notations and corrections on submittal and requirements of Contract documents. Final acceptance will depend upon that compliance.
- Revise And Resubmit: Do not proceed with part of work covered by submittal including purchasing, fabricating, and delivering. Revise or prepare new submittal in accordance with notations and resubmit.

Samples:

Submit samples to illustrate functional and aesthetic characteristics of products with all integral parts and attachment devices. Include full range of manufacturer's standard finishes, indicating colors, textures, and patterns for A/E selection. Submit the number of samples specified in individual specification sections. One sample will be retained by A/E.

Items Requiring Submittal are as Follows:

Insulation

All items listed in MANUFACTURERS: Section of 230010

ASBESTOS:

At any time the Contractor encounters asbestos, he shall immediately stop work in the immediate area and suspend any further work until asbestos is removed. Contractor shall, upon discovery of asbestos, notify owner, or owner's representative, who shall be responsible for the removal of the asbestos, all in accordance with NESHAP (National Emission Standard for Hazardous Air Pollutants). Any form of

asbestos removal or demolition shall be by owner. Engineer is not an "Owner or Operator" as defined under NESHAP.

Contractor is responsible for, and shall be aware of all state and federal laws pertaining to asbestos as well as NESHAP requirements.

LEAD FREE:

All solder, flux and pipe used in water system must be lead free. Lead free is defined as less than 0.2 percent lead in solder and flux and less than 8.0 percent lead in pipes and fittings.

AMERICANS WITH DISABILITIES ACT:

All items or work under this division of the specifications shall comply with guidelines as set forth in the Americans With Disabilities Act.

PERMITS AND FEES:

Obtain permits, licenses, pay fees, etc. as required for performance of Contract. Arrange for necessary inspections required by governing authority and deliver certificates of approval to Architects or their representatives. File plans required by governing body.

DEFINITIONS:

In this division of the specifications and accompanying drawings, the following definitions apply:

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 and operation.

Install (Installed): To furnish and install complete and ready for operation.

Furnish: To purchase, pay for, and deliver to the job site for installation by others.

The Mechanical Contractor is cautioned that "furnish" requires coordination with others. Such coordination costs shall be included as part of Mechanical Contractor's bid.

CUTTING AND PATCHING:

Cutting of walls, floors, roofs, partitions, and ceiling, required for proper installation of the systems shall be performed under this contract.

Cutting shall be done in a neat, workmanlike manner. No joist, beams, girders, columns, or other structural members may be cut without written permission from the Engineer. When possible, holes shall be saw-cut or core drilled neat to minimize patching.

Re-routing of existing pipes, insulation, etc. as required for installation of new system is included in this work. All work shall be done in accordance with specifications for new work of the particular type involved.

Patching shall be performed to match existing structures, exterior walls and roofs, and shall form watertight installation.

VERIFICATION OF DIMENSIONS, ETC.:

The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work, working conditions, verify all dimensions in the field, advise the Engineer of any discrepancy, and submit shop drawings of any changes he proposes to make in quadruplicate for approval before starting the work. Contractor shall install all equipment in a manner to avoid building interference.

COORDINATION WITH OTHER TRADES:

Coordinate all work of each section with work of other sections to avoid interference. Bidders are cautioned to check their equipment against space available as indicated on drawings, and shall make sure that proposed equipment can be accommodated. Before beginning work under each section, inspect installed work of other trades and verify that such work is complete to the point where the installation may properly begin.

Where equipment supplied by an approved manufacturer is substituted for the specified equipment, the Contractor will be responsible for coordinating any changes required in his work or other trades work, including but not limited to electrical requirements, structural steel requirements and space requirements. Any additional costs required to make changes to other trades work shall be borne by this contractor.

PROTECTION OF ADJACENT WORK:

Protect work and adjacent work at all times with suitable covering. All damage to work in place caused by Contractor shall be repaired and restored to original good and acceptable condition using same quality and kinds of materials as required to match and finish with adjacent work.

EXISTING EQUIPMENT AND MATERIALS:

All items of equipment removed under this section of the specifications shall become the property of this Contractor shall be promptly removed from this site.

FIRESTOPPING:

Provide firestopping for all mechanical penetrations through fire resistant walls and shaft enclosures, and floor, ceiling, and roof elements of fire resistant assemblies. Firestopping shall provide rating comparable to rating of structure it protects.

Firestopping materials currently classified with UL as "Through Penetration Firestop Systems".

Firestopping materials shall have been tested in accordance with UL 1479 "Fire Tests of Through Penetration Firestops".

CLEAN-UP:

At the completion of the contract work, all areas where work has been performed shall be left clean. All trash shall be removed from the site by the Contractor.

APPROVALS AND SUBSTITUTIONS:

Notwithstanding any reference in the specifications to any article, device, product, material, fixture, form, or type of construction by name, make or catalog number, such references shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the Contractor, in such cases, may at his option use any article, device, product, material, fixture, or type of construction which, in the judgment of the Engineer, expressed in writing, is equal to that specified.

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 Engineer ten (10) days prior to bid date. Requests shall be accompanied by samples, descriptive literature and engineering information as necessary to fully identify and evaluate the product. No increase in the contract sum will be considered when requests are not approved.

The Contractor shall bear the burden and cost of coordinating with all trades any changes in work required by substitutions, including but not limited to electrical connections, additional components required, service clearance, etc.

AS-BUILT DRAWINGS:

The Contractor shall keep a record set of drawings on the job; and as construction progresses shall show the actual installed location of all items, material, and equipment on these job drawings. Indicate approved changes in red ink.

At the time of final completion, a corrected set of As-Built drawings shall be delivered to the Engineer. A final set of reproducible drawings with job information that reflects the actual installation shall be prepared by the Engineer and given to the Owner.

WARRANTY:

The Contractor for each section of the work under this division will furnish to the Owner a written warranty for the installation as installed, including controls and all other equipment covered under each section of the specifications, to perform in a quiet, efficient, and satisfactory manner with no more than normal service.

Each warranty shall extend for a period of one year following substantial completion and acceptance of construction. They shall be endorsed by the Contractor. Refrigeration compressors shall have a five (5) year warranty.

MANUFACTURERS:

In order to define requirements for quality and function of manufactured products, and requirements such as size, gauges, grade selection, color selections and like specifications requirements, the specifications as written hereinafter are based upon products of those manufacturers who are named hereinafter under various specifications for materials.

In addition to products of manufacturers named hereinafter in the specifications, equivalent products of the following named manufacturers will be acceptable under the base bid:

Unitary Heat Pump Units:

Carrier Air Conditioning Company, The Trane Company

Ductless Split Heat Pumps:

Mitsubishi, Daikin

Air Filters:

Farr Filter Company, Flanders Filters, American Air Filter Company

Air Distribution:

Metal Industries, Price Company, Titus Manufacturing Company, Nailor Industries, Anemostat Products Division, Krueger, J & J Register Co., Carnes Company, Tuttle and Bailey

Dampers:

Ruskin Manufacturing Company, NCA Manufacturing, Safe Air/Dowco, Inc., Cesco Products, Inc., Leader Industries, Pottorff, Arrow United, Young Regulator

Adhesives and Sealants:

Childers, Hardcast, TACC International, MEI Industries, McGill Airseal Corporation, Duro Dyne, Ductmate Industries, Design Polymeric

Seismic and Vibration Equipment:

Mason Industries, Vibration Mountings & Controls, Inc., Amber/Booth Company, Vibration Eliminator Co., Kinetics Noise Control

Tanks:

Taco, Inc., Bell and Gossett Company

Temperature and Air Pressure Gages:

Dwyer Instruments, Weiss Instruments, H.O. Trerice Company, Ellison Draft Gauge Company, Inc., Weksler Instrument

Insulation:

Owens Corning, Johns Manville, CertainTeed Corporation, Knauf Insulation

Temperature Controls:

Johnson Controls

Valves:

Crane Company, Grinnell Company, O.I.C. Valve Co., Chase Brass & Copper Company, Rockwell Manufacturing Company, Consolidated Brass Company, Hammond, Nibco.

Pipe Hangers:

Cooper B-Line, Fee and Mason Manufacturing Company, Anvil International, Erico Caddy, Tolco a Division of Nibco

Identification Items:

Seton Name Plate Company, W.H. Brady Company, Handley Industries, Inc.

PART 2 - PRODUCTS

PAINTING:

Furnish touch up paint supplied by equipment manufacturer.

Coat ferrous metal surfaces that do not have factory painting or galvanizing with one coat of Sherwin Williams high heat aluminum paint.

CONCRETE EQUIPMENT FOUNDATIONS:

Use 3000-psi "batch plant" reinforced concrete foundations.

NAME PLATES:

All equipment provided under this division shall be labeled with a Bakelite nameplate 1" x 3" minimum with 3/8" minimum height lettering as manufactured by Seton Name Plate Company. See filter nameplate requirement below.

VALVES:

All valves provided under each section shall be of a single manufacturer unless otherwise specified. Leave packing for all valves in good condition, replacing as necessary for completion of work. Packing is to be of an approved material suitable for required service. Valve manufacturer and pressure rating shall be cast on side of valve body. Each threaded valve shall have a union installed adjacent to it. All valves shall be of listed manufacturer as scheduled hereinafter in other sections of Division 15.

PRESSURE GAUGES:

Pressure gauges shall be installed as indicated on the drawing. Pressure gauges shall be equal to Weiss model LF401 liquid filled with stainless steel bayonet and case. Except as otherwise specified or shown, gauges shall have 4" dials.

Each gauge shall be equipped with a brass needle valve.

Each steam gauge shall be equipped with syphon.

Gauges shall be installed in such a manner so as to be accessible and easily read. Range of gauge for each particular point of application shall be selected so that pointer is approximately in midpoint of scale under normal operating conditions.

FIRESTOPPING MATERIALS:

The material used to fill the annular space shall prevent the passage of flame and hot gases sufficient to ignite cotton waste when subjected to ASTM E 119 time-temperature fire conditions under a minimum positive pressure differential of 0.01 inches of water at the location of the test specimen for the time period equivalent to the fire resistance rating of the construction penetrated. Material shall be capable of curing in the presence of atmospheric moisture to produce durable and flexible seal, and will form airtight and watertight bonds with most common building materials in any combination including cement, masonry, steel, and aluminum.

SLEEVES AND OPENINGS:

Provide UL certified fire stop sleeving system for all pipe penetrations through fire rated walls, floors, partitions, ceilings, floor-ceiling assemblies and roofs as tested under ASTM E814-02 "Standard Method of Fire Tests of Through Penetration Fire Stops".

SEISMIC RESTRAINTS:

Seismic restraints shall be provided per International Building Code Chapter 16 for Category D Buildings (See Code Compliance on Drawing Cover Sheet), specification section 230548 and the drawings.

PART 3 - EXECUTION

CONCRETE EQUIPMENT FOUNDATIONS:

Consult ASHRAE: A Practical Guide to Seismic Restraint, Chapter 6 for specific reinforcement and anchoring details, with respect to pad size and seismic forces. Unless otherwise noted, set all floor mounted and "on-grade" mounted equipment on 6" high concrete foundation pads. Concrete foundations shall be reinforced with #4 bars - 12" o.c. both ways, or as directed by A Practical Guide to Seismic Restraint. Pads shall be approximately 6" larger than equipment base, and have 1" x 1" chamfer on all edges. Pads shall have carborundum brick rubbed finish. Surface finish shall be uniformly smooth. Concrete floor shall be rough and foundation doweled to floor per A Practical Guide to Seismic Restraint.

PIPE FITTINGS:

General: Provide complete systems of piping and fittings for all services as indicated. All pipe, valves, and fittings shall comply with American National Standards Institute, Inc. Code and/or local codes and ordinances. All fittings shall be domestically produced from domestic forgings. Cut pipe accurately to measurements established at building or site, and work into place without springing or forcing, properly clearing all windows, doors, and other openings or obstructions.

PIPE:

All piping material shall be as specified in other sections of this division.

Fittings and Connections: All turns and connections shall be made with long radius fittings as scheduled hereinafter. No miter connections will be permitted in welded work.

Pipe joints shall be made in accordance with the following applicable specifications:

Make all solder joints with non-corrosive type flux 95 Percent tin and 5 percent antimony alloy solder.

PIPE HANGERS, SUPPORTS AND INSERTS:

Pipe hangers, supports and inserts shall comply with Table 305.4 of the 2006 International Mechanical Code and be provided as follows:

All piping shall be supported by forged steel hangers or brackets suitably fastened to structural portion. Wall brackets shall be Fee & Mason Fig. No. 151. Provide lock nuts on all adjustable hanger assemblies.

PIPE SIZE - INCHES

1/2 – 2 2-1/2 – 4 6 – Up Wall Plate Hanger

Grinnel	104	260	171	139
Fee & Mason	199	239	170	302
Elcen	92	12	15	---

Hanger or Support Spacing (unless specified different hereinafter):

Hanger or support maximum spacing shall be as follows:

Copper Pipe:

Nominal Pipe Size – Inches	Maximum Span - Feet
1-1/4" and under	6'
1-1/2" and above	10'

Size hangers on insulated piping to permit insulation and saddles to pass full size through hanger.

Trapeze Hangers:

May be used for groups of pipes close together and parallel. Trapeze hangers may be constructed from structural channel or angle irons or from pre-formed channel shapes. All pipe lines must be held on specific centers by U bolts, clips or clamps.

INSULATION SHIELDS:

Provide all insulated piping with 10-inch long (16 gauge) protective galvanized sheet metal shields extending 120 degrees around bottom of insulated pipe.

DIELECTRIC CONNECTIONS:

Wherever any connection is made between dissimilar metals, provide dielectric pipe couplings or unions.

ELECTRIC WORK:

All motors, and motor starters shall be furnished for items installed under this division of the specifications. All starters shall be magnetic type. All electrically operated equipment shall have readily accessible nameplates summarizing electrical information (i.e., voltage, phase, horsepower, watts, or amperes). Starters shall be as manufactured by General Electric Company, Westinghouse Electric Company, Cutler-Hammer Inc., or Square D Company. A.C. magnetic starters shall be across-the-line type. Starters shall provide overload protection in each phase and shall otherwise conform to all applicable requirements of these specifications. All magnetic starters shall be combination type, Motor Circuit Protector (MCP) type having interrupting rating equal to or greater than the available short circuit current, with "HAND-OFF-AUTO" selector switch, auxiliary contact, and pilot light in cover. Provide laminated plastic nameplates with white center core for each starter.

For motors controlled by variable frequency drives, provide shaft grounding on the motor equal to Aegis bearing protection ring.

All control conduit and wires and control devices shall be furnished and installed under this division. All contactors shall be of the mechanically held type. All control wiring within starters shall be installed in a workmanlike manner and neatly laced. All control wiring shall be color coded.

All work shall conform with the applicable requirements of the National Electrical Codes. All electrical power characteristics shall be as indicated. All devices, which make and/or break electrical circuits, shall be rated for at least 125 percent of the load.

Relays, contactors, and control devices shall open all ungrounded conductors. All fuses shall be current limiting time delay type equal to Bussman "LPN", 250 volt or "LPS", 600 volt.

Control voltage shall not exceed 120 volts. Control power shall be taken from line terminals of controllers. Where necessary, control transformers shall be provided and shall conform to NEMA Standards, properly sized, and shall be properly fused. Where control voltage is 120 volts, control conductors shall be color-coded.

Electrical power service and connections to all equipment in this division will be made under electrical division of the work.

Manual motor starters with overload protection shall be flush mounted type with pilot light. Square D Catalog No. 2510-FS-1P or General Electric, or Westinghouse equivalent.

Duct smoke detectors shall be provided under electrical division and installed under this division. This division shall provide interlock wiring required for fan shutdown and smoke damper control. Power wiring and fire alarm communication wiring shall be provided under the electrical division.

ITEMS OF MECHANICAL EQUIPMENT:

All items of mechanical equipment electrically operated shall be in complete accordance with paragraph in this division entitled "Electrical Work". Mechanical equipment, other than individually mounted motors, shall be factory pre-wired to a single-set of line terminals and to a single load terminal strip to match load terminals on equipment. Each step shall have properly sized contactor and overcurrent protection.

Mechanical equipment electrical components shall all be bonded together and connected to electrical system ground.

CLEANING:

All surfaces on metal, pipe, insulation covered surfaces, and other equipment furnished and installed under this division of the specifications shall be thoroughly cleaned of grease, scale, dirt and other foreign material.

Upon complete installation of ducts, clean entire system of rubbish, plaster, dirt, etc., before installing any outlets. After installation of outlets and connections to fans are made, blow out entire system with all control devices wide open.

SYSTEM BALANCING:

The HVAC Contractor is responsible for the entire Test & Balance process. The contractor shall employ an independent balancing firm specializing in total system air balancing as approved by the engineer and certified by the AABC or NEBB. The balancing firm shall be employed prior to installation of any ductwork. Provide all labor, engineering and test equipment required to test, adjust, and balance all heating, ventilating, air conditioning, and exhaust systems.

The Contractor is responsible to have a functioning system prior to Testing and Balancing, to provide a joint and cooperative effort to coordinate the test and balance, and to solve any problems in balancing and controls in order to establish proper system performance before leaving the job. The Contractor is responsible for providing the Test and Balance Agency (TAB) with a complete set of project drawings,

specifications, and submittals, and for providing and installing new sheave or sheaves, new belts, as required, if a change in fan speed is necessary which cannot be made by adjusting the sheave originally installed. When requested by the Engineer, the TAB Agency will review plans and specifications of the systems prior to installation and submit a report of any deficiencies, which could preclude proper adjusting, balancing and testing of the system. The TAB agency shall submit copies of deficiency reports along with a preliminary report to the Engineer for review prior to final submittal.

Instruments used will be those that meet the instrument requirements for Agency Qualifications of the AABC as published in the NEBB "Procedural Standards for Testing Adjusting and Balancing of Environmental Systems" or the AABC "National Standards for Total System Balance".

Fan air volume shall be adjusted to within 5% of design, and diffuser air volumes to within 10% of design.

Reporting (Submit five copies of final Test Report)

- Complete nameplate data and equipment schedule number for all rotating equipment.
- Design and actual operating data for all rotating equipment including inlet and outlet data, flow rates, amps, voltage and rpm.
- Design and actual duct and diffuser volumes. Prepare a diagram showing flow measurement points.
- Record coil air pressure drop, filter pressure drop, external static pressure, and fan static pressure.

TESTING (PIPING):

Upon completion of each system of work under this division, and at a designated time, all piping shall be pressure tested for leaks in the presence of the owner. Owner shall be notified five days before testing is to be conducted and all tests shall be conducted in the presence of the owner. All equipment required for test shall be furnished by contractor at his expense. All tests shall be performed as specified hereinafter. If inspection or tests show defects, such defective work or material shall be replaced and inspection and tests repeated at no additional cost to owner. Make tight any leaks. Repeat tests until system is proven tight. Caulking of leaks will not be permitted. All equipment not capable of withstanding the test pressure shall be valved off during the test.

All refrigerant piping and apparatus shall be tested with dry carbon dioxide or nitrogen plus a small amount of refrigerant. All refrigerating equipment shall be tested under vacuum and shall show no evidence of leakage with an absolute pressure of .20 inch mercury gauge, sustained for a period of one hour without pumping. Leaks shall be corrected by remaking the joint. Test pressures shall be as follows:

High Side	Low Side
Refrigerant 410A - 400 psi	Refrigerant 410A - 350 psi

Install a card conspicuously and as near as practicable to the refrigerant condensing unit giving instructions for the operation of the system, including precautions to be observed in case of a breakdown or leak.

Each refrigerating system shall be provided with an easily legible metal sign permanently attached and easily accessible, indicating thereon the name and address of the manufacturer or installer, the kind and total number of pounds of refrigerant contained in the system and the field test pressure applied.

PIPE CODING:

After all piping has been painted with color-coding, all piping installed under this division shall be coded and marked with "Perma-Code" pipe markers as manufactured by W.H. Brady Company, 712 Glendale

Avenue, Milwaukee, Wisconsin. Markers shall be applied to properly identify piping, but in no case shall they be applied more than 20 feet apart. Markers shall be 1-1/8 inch by 7 inches and shall be secured by spiral wrapping with 3/4 inch wide vinyl banding tape, color matching service, at each end of marker.

IDENTIFICATION OF EQUIPMENT IN MECHANICAL AREAS:

All items of mechanical equipment shall be identified with a black bakelite label with engraved white lettering 1/2" tall. Labels shall be mechanically attached to the equipment with rivets or stainless steel screws. Thermostats and control devices shall be identified with a black bakelite label with engraved white lettering 1/4" tall. Lettering shall correspond with the tags shown in the drawings.

ADJUSTMENT AND TRIAL RUNS:

Upon completion of all work, the contractor shall operate the system in the presence of the owner for the purpose of demonstrating quiet and satisfactory operation, the proper setting of controls, safety and relief valves, and cleanliness of system. Heating and cooling shall be tested separately during periods approaching design conditions and shall fully demonstrate fulfillment of capacity requirements. Test procedures shall be in accordance with applicable portions of ASME, ASHRAE, and other generally recognized test codes as far as field conditions will permit. Any changes or adjustment required shall be made by the contractor without additional expense to owner.

Document and submit all operating conditions (startup report) of equipment during trial runs and after test and balance is complete. Include in the report:

- Ambient air temperature
- Design operating temperatures and flow rates
- Entering and leaving air temperatures across each coil or heating device
- Amp draw of all motors and nameplate amps
- Voltage at each piece of equipment
- Refrigerant pressures and temperatures

OPERATION AND MAINTENANCE INSTRUCTIONS, AND MAINTENANCE MANUAL:

Upon completion of work, and at a time designated by the engineer, a competent employee of the contractor shall be provided to instruct a representative of the owner in the operation and maintenance of the system.

Minimum instruction period shall be:

- Air Conditioning System - 1 day

Maintenance Manuals: The contractor shall compile and bind five (5) sets of all manufacturer's instructions and descriptive literature on all items of equipment furnished under this work. These instructions shall be delivered through the general contractor to the engineer for approval prior to final inspection.

Instructions shall include:

- Warranty letter signed by the Mechanical Contractor.
- Index for each section with each section properly identified.
- Complete equipment list with model and serial numbers.
- Complete equipment list with filter sizes and quantities.
- Copy of one complete, approved submittal for each equipment section.
- Description of each system, including manufacturer's literature for all items.

- Start-up and shut-down description for each system.
- Suggested operating and maintenance instructions with frequency of maintenance indicated.
- Parts list for all items of equipment.
- Name, address, and telephone number of nearest sales and service organization for all items of equipment.
- Startup reports.
- Test and Balance Reports

Manuals shall be 8-1/2 x 11 inch text pages bound in three ring expansion binders with a hard durable cover with clear plastic pocket on front for title page. Prepare binder covers with printed subject title of manual, title of project, date, and volume number when multiple binders are required. Printing shall be on face and spine. Provide a table of contents for each volume. Internally subdivide the binder contents with divider sheets with typed tab titles under reinforced plastic tabs. Provide directory listing as appropriate with names addresses, and telephone numbers of design consultant, Contractor, subcontractors, equipment suppliers, and nearest service representatives.

End of Section 230010

SECTION 230500 – HEATING, VENTILATION AND AIR CONDITIONING

PART 1 - GENERAL

General Requirements: This Section of the Specifications and related drawings describe requirements pertaining to Air Conditioning, Heating and Ventilation work, including applicable HVAC Insulation in separate Section 230700 and Vibration Isolation and Seismic Restraint in separate Section 230548. All work shall comply with Section 230010 - General Provisions - HVAC.

Construct rectangular ductwork to meet all functional criteria defined in Section VII, of the SMACNA "HVAC Duct Construction Standards Metal and Flexible" 2005 Edition. All ductwork must comply with all local, state and federal code requirements.

PART 2 - PRODUCTS

SUBMITTALS:

Ductwork shop drawings must be submitted for approval by Engineer. Any ductwork installed without prior approval by the Engineer shall be replaced at the expense of the contractor.

QUALITY ASSURANCE:

The contractor must comply with this specification in its entirety. At the discretion of the Engineer, sheet metal gauges, and reinforcing may be checked at various times to verify all duct construction is in compliance.

DUCTS, PLENUM, ETC.:

As indicated on drawings, provide a system of metal ducts for supply, return and exhaust air.

All sheet metal, ducts, casing, plenums, etc., of sizes indicated, shall be constructed from prime galvanized sheet steel.

DUCTS THRU WALLS:

Where ducts pass through masonry walls, protect duct from contact with wall by 1/2 inch thick filler of fire rated felt or sponge rubber.

Provide sheet metal flashing around all duct penetrations.

Ducts shall be properly sealed per the fire rating and UL assembly.

INSTRUMENT TEST HOLES:

Install for air handling units instrument test holes in supply, return and outside air duct. Instrument test connections shall be Ventlock Model 699-2, or equal, and shall be located in accessible locations.

AIR DISTRIBUTION:

Devices shall quietly and draftlessly deliver and/or remove air quantities required to attain conditions indicated. Devices shall have sponge rubber gaskets for sealing devices to walls and ceilings. Exposed surfaces shall have baked enamel finish of manufacturer's standard colors noted.

All air distribution equipment and accessories shall be as scheduled on drawings.

METAL DUCTWALL:

All interior ducts shall be constructed of G-60 or better galvanized steel (ASTM A653) LFQ, chem treat. Exterior ductwork or duct exposed to high humidity conditions shall be constructed of G-90 or better galvanized steel LFQ, chem treat. Galvanized metal ducts shall be a minimum thickness of 24 gage.

Low Pressure Supply Duct:

Ductwork downstream from the VAV box, ductwork on low pressure supply and return systems and restroom exhaust duct shall be fabricated to meet minimum 2" w.g. pressure class in accordance with SMACNA Duct Construction Standard.

LONGITUDINAL SEAMS:

Pittsburgh lock shall be used on all longitudinal seams. All longitudinal seams will be sealed with mastic sealant. Snaplock is not acceptable.

SEALERS:

Duct sealer shall be flexible, water-based, adhesive sealant designed for use in all pressure duct systems. After curing, it shall be resistant to ultraviolet light and shall seal out water, air, and moisture. Sealer shall be UL listed and conform to NFPA 90A & 90B. Sealer shall be Childers CP-145A, or equal.

DUCTWORK HANGER/SUPPORT:

Hang and support ductwork as defined by SMACNA, Chapter 5 2005 Manual, First Edition, or as defined within. Hanger spacing not to exceed 8'

TURNING VANES:

Turning vanes shall be Harper double wall turning vanes fabricated from the same material as the duct. Tab spacing shall be SMACNA Standard. Rail systems with non-standard tab spacings shall not be accepted. All tabs shall be used, do not skip tabs. Mounting rails shall have friction insert tabs which align the vanes automatically. Vanes shall be subjected to tensile loading and be capable of supporting 250 lbs. when fastened per the manufacturers instructions.

APPARATUS CONNECTIONS:

Flexible connections: For low velocity ductwork (less than 2,400 FPM), provide flexible connections at inlet and outlet of each fan connected to ductwork and elsewhere as indicated. Flexible connections shall be 6 inches wide, waterproof and fireproof, and shall be equal to "Hardcast Connector Plus Neoprene" flexible connectors. Provide at least one inch slack.

PIPE AND FITTINGS:

Schedule of pipe and fittings: Piping and fittings shall conform to requirements as indicated herein.

All pipe shall be domestically produced from domestic forgings.

SCHEDULE OF PIPING

SERVICE	ITEM	PIPING	FITTINGS	FLANGES OR UNIONS
Hot Water	2" and smaller	Type L, Hard	Solder type	Wrought
Unitary Condensate Drain	2" and smaller	Type L, Hard drawn copper	Solder type wrought copper	Wrought solder copper to copper

COMBINATION STOP-BALANCING VALVES:

Ball Valves:

Sizes up to and including 2":

NIBCO 585 ball valves, bronze body, threaded or soldered ends, 150 pound saturated steam and memory stop with "Nib-Seal" insulated handle.

REFRIGERANT PIPING:

General: Execute all refrigerant piping with stamped type "ACR" hard copper and long radius, wrought copper, sweat fittings with tolerance not to exceed 3/1000 of an inch. All joints shall be made with silver solder. Submit equipment manufacturer's suggested piping diagram for approval.

Materials: Copper pipe and fittings shall be as manufactured by Mueller Brass Company; expansion valves of proper capacity as manufactured by Sporlan; strainers shall be V-type as manufactured by Sporlan; catch-all replaceable core type drier as manufactured by Sporlan; solenoid valve and sight glass as manufactured by Sporlan.

After refrigerant piping has been installed and tested, each system shall be evacuated and charged with proper refrigerant of quantity as recommended by manufacturer.

CONVERTERS, EXPANSION TANKS, AIR VENTS AND AIR REMOVAL EQUIPMENT:

Converters, expansion tanks, air vents and air removal equipment shall be of the characteristics and capacities indicated on drawings and as manufactured by Bell and Gossett Company, and ASME stamped. Install manual air vents at all high points where indicated and where required to properly and adequately vent systems. All above equipment shall be manufactured by one manufacturer, and completed systems shall be installed in accordance with manufacturer's instructions. Certificates shall be furnished to Engineer for all ASME stamped equipment and for performance guarantee of air removal system to prevent air accumulation and air noise in system.

AIR HANDLING UNITS:

Provide Trane split system air handling unit(s) or approved equal (see Section 230010) of the type, arrangement, size, and indicated capacities and characteristics. Air handler shall be completely factory assembled including coil, condensate drain pan, fan motor(s), filters and controls in an insulated casing that can be applied in a vertical or horizontal configuration. Units shall be UL listed and tested in accordance with ARI standard 210/240 or 340/360. Units shall be UL listed and labeled in accordance with UL 1995 for indoor blower coil units.

Unit casing shall be constructed of zinc coated, heavy gauge, galvanized steel. Exterior surfaces shall be cleaned, phosphatized and finished with a weather resistant baked enamel finish. Casing shall be completely insulated with cleanable, foil faced, fire retardant permanent, odorless glass fiber material. All insulation edges shall either be captured or sealed. Knockouts shall be provided for unit electrical and refrigerant piping connections. Captive screws shall be standard on all access panels.

Each refrigerant circuit shall be controlled by a factory installed thermal expansion valve. Coil shall be arranged for a draw through airflow and shall provide a double sloped drain pan constructed of PVC plastic. The drain pan shall be removable for cleaning. The condensate pan can be installed in any of four positions allowing for horizontal or vertical application and providing external connections on either side of the unit.

Double inlet, double width, forward curved centrifugal-type fan(s), with adjustable belt drive shall be standard for AHU's 7-1/2 tons and larger. Thermal overload protection shall be standard on motor. Fan and motor bearings shall be permanently lubricated.

Magnetic evaporator fan contactor, low voltage terminal strip, check valves and single point power entry shall be included. All necessary controls shall be factory wired.

Filter rack shall be accessible from the side access panel. Filters shall be two inch throwaway pleated style for AHU's 7-1/2 tons and larger.

HEAT PUMP UNITS:

Provide Trane split system heat pump unit(s) or approved equal (see Section 230010) of the type, arrangement, size, and indicated capacities and characteristics. Unit shall be assembled on heavy gauge steel mounting rails and shall be weatherproofed. Unit shall include a hermetic scroll or reciprocating compressor(s), plate fin condenser coil, fans and motors, controls and holding charge of nitrogen. Units 6 tons and less shall have a factory charge of Freon for up to 15' length of tubing. Operating range shall be 115°F to 50°F in cooling as standard. Units shall be UL 1995 listed and tested in accordance with ARI standard 210/240 or 340/360.

Unit casing shall be constructed of zinc coated, heavy gauge, galvanized steel. Exterior surfaces shall be cleaned, phosphatized and finished with a weather resistant baked enamel finish. Units shall be tested 500 hours in salt spray.

Each refrigeration circuit shall have an integral subcooling circuit. A refrigeration filter drier, expansion valve and check valves shall be provided as standard. Units shall have both a liquid line and a suction line service valve with gauge port. The direct drive hermetic scroll compressor shall have a centrifugal oil pump providing positive lubrication to moving parts. Motor shall be suction gas cooled and shall have a voltage utilization range of +/- 10% of name plate voltage. Crankcase heater, discharge line thermostat, internal temperature and current sensitive motor overloads shall be included for maximum protection. External high and low pressure cutout devices shall be provided. Evaporator defrost control provided in indoor blower coil unit shall prevent compressor slugging by temporarily interrupting compressor operation when low evaporator coil temperatures are encountered.

Coils shall be internally finned or smooth bore 3/8" copper tubes mechanically bonded to configured aluminum plate fin as standard. Coil shall be factory leak tested to 420 psig air pressure.

Permanently lubricated totally enclosed or open drip proof type motors shall be provided and shall have built in current and thermal overload protection.

Unit shall be completely factory wired with necessary controls and contactor pressure lugs or terminal block for power wiring. Control wiring shall be 24-volt control circuit which includes fusing and control

transformer. Electronic timed initiated, temperature terminated defrost system with choice of 50, 70, or 90 minute cycle. Timed override limits defrost cycle to 10 minutes.

Provide complete system of air conditioning units and accessories as scheduled on the drawings. All units shall carry a five (5) year compressor warranty.

DUCTLESS SPLIT SYSTEM UNITS (WALL MOUNTED DAHU):

Provide Mitsubishi ductless split system air conditioning unit(s) or approved equal (see Section 230010) of the type, arrangement, size, and indicated capacities and characteristics. The system shall consist of a wall mounted indoor section with wired, wall mounted controller and a horizontal discharge, single phase outdoor unit. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL) and shall bear the ETL label. All wiring shall be in accordance with the National Electrical Code (N.E.C.). The units shall be rated in accordance with Air-conditioning Refrigeration Institute's (ARI) Standard 210 and bear the ARI Certification label. The units shall be manufactured in a facility registered to ISO 9001 and ISO 14001, which is a set of standards applying to environmental protection set by the International Standard Organization (ISO). A dry air holding charge shall be provided in the indoor section. The outdoor unit shall be pre-charged with R-410a refrigerant for 70 feet of refrigerant tubing.

The indoor unit cabinet shall be wall mounted by means of a factory supplied mounting plate, The cabinet shall be formed from high strength molded plastic with front panel access for filter. The indoor unit shall be factory assembled, wired and tested. Contained within the unit shall be all factory wiring and internal piping, control circuit board and fan motor. The unit in conjunction with the wired, wall mounted controller shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, and a test run switch. Indoor unit and refrigerant pipes shall be purged with dry nitrogen before shipment from the factory.

The evaporator fan shall be high performance, double inlet, forward curve, direct drive fan. The fans shall be statically and dynamically balanced and run on a motor with permanently lubricated bearings. There shall be a motorized horizontal vane to automatically direct air flow in a horizontal and downward direction for uniform air distribution. The horizontal vane shall significantly decrease downward air resistance for lower noise levels, and shall close the outlet port when operation is stopped. There shall also be a set of vertical vanes to provide horizontal swing airflow movement.

Return air shall be filtered by means of an easily removable washable filter.

The evaporator coil shall be of nonferrous construction with pre-coated aluminum strake fins on copper tubing. The multi-angled heat exchanger shall have a modified fin shape that reduces air resistance for a smoother, quieter airflow. All tube joints shall be brazed with PhosCopper or silver alloy. The coils shall be pressure tested at the factory. A condensate pan and drain shall be provided under the coil.

The electrical power of the unit shall be 208 volts or 230 volts, 1 phase, 60 hertz. The system shall be capable of satisfactory operation within voltage limits of 198 volts to 253 volts. The power to the indoor unit shall be supplied from the outdoor unit, using the Mitsubishi Electric A-Control system. For A-Control, a three (3) conductor AWG-14 wire with ground shall provide power feed and bi-directional control transmission between the outdoor and indoor units.

The control system shall consist of two (2) microprocessors, one on each indoor and outdoor unit. Field wiring shall run directly from the indoor unit interconnected by a single non-polar two-wire AWG-16 stranded cable to the wall mounted controller with no splices. The control system between the outdoor unit and indoor unit shall be supplied from the outdoor unit using the Mitsubishi Electric A-Control system.

The system shall be capable of automatic restart when power is restored after power interruption. The system shall have self-diagnostics ability, including total hours of compressor run time. Diagnostics codes for indoor and outdoor units shall be displayed on the wired controller panel.

The microprocessor located in the indoor unit shall have the capability of monitoring return air temperature and indoor coil temperature, receiving and processing commands from the wired controller, providing emergency operation and controlling the outdoor unit.

The indoor unit shall be connected to a wall mounted wired controller to perform input functions necessary to operate the system. The wired controller shall have a large multi-language DOT liquid crystal display (LCD). There shall be a built-in weekly timer with up to eight pattern settings per day. The controller shall consist of an On/Off button, Increase/Decrease Set Temperature buttons, a Cool/Dry/Fan mode selector, a Timer Menu button, a Timer On/Off button, Set Time buttons, a Fan Speed selector, a Vane Position selector, a Louver Swing button, a Ventilation button, a Test Run button, and a Check Mode button. The controller shall have a built-in temperature sensor.

The wired controller shall display operating conditions such as set temperature, room temperature, pipe temperatures (i.e. liquid, discharge, indoor and outdoor), compressor operating conditions (including running current, frequency, input voltage, On/Off status and operating time), LEV opening pulses, sub cooling and discharge super heat.

The control voltage from the wired controller to the indoor unit shall be 12 volts, DC. The control signal between the indoor and outdoor unit shall be pulse signal 24 volts DC.

The outdoor unit shall be equipped with a control board that interfaces with the indoor unit to perform all necessary operation functions. The outdoor unit shall be capable of operating at 0°F ambient temperature. The casing shall be constructed from galvanized steel plate, coated with a finished with an electrostatically applied, thermally fused acrylic or polyester powder coating for corrosion protection. The fan grille shall be of ABS plastic.

The outdoor fan motor shall be of aerodynamic design for quiet operation, and the fan motor bearings shall be permanently lubricated. The outdoor unit shall have horizontal discharge airflow. The fan shall be mounted in front of the coil, pulling air across it from the rear and dispelling it through the front. The fan shall be provided with a raised guard to prevent contact with moving parts.

The L shaped condenser coil shall be of copper tubing with flat aluminum fins to reduce debris build up. The coil shall be protected with an integral metal guard. Refrigerant flow from the condenser shall be controlled by means of linear expansion valve (LEV) metering orifice. The LEV shall be control by a microprocessor controlled step motor.

The compressor shall be a DC rotary compressor with Variable Compressor Speed Inverter Technology. The compressor shall be driven by inverter circuit to control compressor speed. The compressor speed shall dynamically vary to match the room load for significantly increasing the efficiency of the system which results in vast energy savings. To prevent liquid from accumulating in the compressor during the off cycle, a minimal amount of current shall be intermittently applied to the compressor motor to maintain enough heat. The outdoor unit shall have an accumulator and high pressure safety switch. The compressor shall be mounted to avoid the transmission of vibration.

The electrical power of the unit shall be 208volts or 230 volts, 1 phase, 60 hertz. The unit shall be capable of satisfactory operation within voltage limits of 198 volts to 253 volts. The outdoor unit shall be controlled by the microprocessor located in the indoor unit. The control signal between the indoor unit and the outdoor unit shall be pulse signal 24 volts DC. The unit shall have Pulse Amplitude Modulation circuit to utilize 98% of input power supply.

PART 3 - EXECUTION

DUCTWORK, GENERAL:

Drawings show general arrangement of duct. Provide all ductwork required to complete installation and avoid interferences. Installation shall conform with applicable portions of Section 230010, General Provisions, HVAC. Fabricate ducts as job progresses, using actual job measurements and referring to architectural, structural, electrical, plumbing and equipment drawings in order to avoid conflicts. Where space limitations preclude use of ducts and fittings as shown, consult Engineer for instructions. All ductwork, offsets, fittings, etc. required to make a complete and efficiently operating installation are included in this contract and shall be fabricated and installed in accordance with SMACNA Standards for the application unless noted otherwise herein.

All duct dimensions shown on drawings are "inside clear". The sizes of acoustically lined ducts and dampers in ducts shall be increased accordingly. Ducts shall be smooth on inside.

Provide flexible duct connectors by Hardcast or equal at all ductwork connections to equipment with fans, motors or rotating components.

Install double thickness turning vanes in duct fittings having centerline radius less than 1-1/2 times width of duct.

Support ducts from building structure with 1 inch wide galvanized steel bands per SMACNA recommendations. Wire hangers and nylon straps will not be acceptable.

Do not install runout drops to ceiling diffusers until ceiling grids have been installed. Center ceiling diffusers between grids.

Seal all joints in supply, return and exhaust ducts with Childers CP-145 Veloseal water based synthetic duct sealant, or equal.

Upon complete installation of ducts, clean entire system of rubbish, plaster, dirt, etc. before installing any outlets. After installation of outlets and connections to fans are made, blow out entire system with all control devices wide open.

PIPING, GENERAL:

All piping shall conform with Section 230010 - General Provisions - HVAC.

Run pipes parallel to walls and ceilings. Wherever pipes change size, use eccentric fittings. Run piping so as not to obstruct walking or service areas.

Pipe and equipment locations shown are approximate. Exact location of equipment, pipes, and chases to be as approved and determined in field to avoid other pipes and maintain structural clearances. Use actual job dimensions and equipment shop drawings for roughing.

Piping to comply with best trade practice. Provide clearance between pipe and building structure so pipes can expand without damage to building structure.

Pipe water relief drains, blowdown, and other drains to, but not into, the most convenient floor drain or where otherwise directed.

When soldering refrigerant pipe joints, a dry nitrogen purge shall be required through the inside of the pipe to prevent oxidation.

EQUIPMENT, GENERAL:

All equipment specified herein shall be installed in accordance with manufacturer's published installation instructions and these specifications. All items shall have adequate clearances for access and maintenance. Each item of equipment shall be performance tested to verify compliance with specifications. Certified data sheets of successful performance tests shall be included in operating manuals.

AUTOMATIC TEMPERATURE CONTROL:

General: Provide a complete system of temperature controls as described herein. The system shall be installed complete by competent mechanics in the employment of the control manufacturer. All control wiring shall be installed in EMT conduit with control and power wiring in separate conduits.

Wiring for low voltage circuits (24 volts or less) may be No. 16 up to 50 feet, and above 50 feet shall be of size to limit voltage drop to 5 percent. Interlock wiring shall be as recommended by equipment manufacturer.

Provide automatic changeover 7 day programmable thermostat per the equipment schedule.

Provide temperature sensors mounted in the space and interface with the existing campus wide Johnson Controls Metasys network. Sensor shall alert maintenance personnel when temperature rises above 80 degrees F (adj). Connection to USC network at data terminal provided by others.

SUBMITTALS:

Provide submittals as required in Section 230010. At completion of work, submit check-out report of automatic control system. Submit start up reports per Section 230010. Submit test and balance report per 230010. Submit manufacturer's installation, operation, and maintenance instructions.

End of Section 230500

SECTION 230548 - VIBRATION ISOLATION AND SEISMIC RESTRAINT

PART 1 – GENERAL

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. 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. 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. The contractor and manufacturer of the isolation and seismic equipment shall refer to the isolator and seismic restraint schedule which 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.

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.

SEISMIC RESTRAINT SHALL NOT BE REQUIRED FOR THE FOLLOWING:

1. 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.
2. 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).
3. High deformability piping (steel, copper, aluminum with welded, brazed, grooved, or screwed connections) designated as having an $I_p = 1.5$ and a nominal pipe size of 1 inch 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.
4. High deformability piping (steel, copper, aluminum with welded, brazed, grooved, or screwed connections) and limited deformability piping (cast iron, FRP, PVC) designated with an $I_p = 1.0$ and a nominal pipe size of 1 inch and less in the mechanical equipment room, or 2" and less outside the mechanical equipment room.
5. PVC or other plastic or fiberglass vent piping.
6. HVAC ducts suspended from hangers that are 12 inches 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.
7. HVAC duct with an $I_p = 1.5$ that have a cross-section area less than 4 square feet. HVAC ducts with an $I_p = 1.0$ that have a cross sectional area of less than 6 square feet.
8. Equipment items installed in-line with the duct system (e.g, fans, heat exchangers and humidifiers) with an operating weight less than 76 pounds. Equipment must be rigidly attached to duct at inlet and outlet.

MANUFACTURER'S RESPONSIBILITIES:

Manufacturer of vibration and seismic control products shall have the following responsibilities:

1. Determine vibration isolation and seismic restraint sizes and locations.
2. Provide piping, ductwork and equipment isolation systems and seismic restraints as scheduled or specified.
3. Provide installation instructions and shop drawings for all materials supplied under this section of the specifications.
4. 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 or greater, and vibration isolated equipment 20lbs or greater.
5. 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.
6. The seismic supplier shall provide a certificate of professional liability insurance for the seismic engineer for an amount not less than \$1,000,000.00.

SUBMITTALS:

Submit shop drawings of all isolators, seismic restraints and calculations provided. 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 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.

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.

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

QUALITY CONTROL:

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). Non-isolated seismic rated curbs by Imperial Metals are acceptable.

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.

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.

VIBRATION ISOLATORS:

Specification W: Pad type mounting consisting of two layers of ribbed elastomeric pads with a 1/2" 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.

ROOFTOP UNIT CURBS AND ISOLATION SYSTEMS:

Specification X: Non isolated seismically rated rooftop curb system that is flashed into roofing membrane. Air and watertight curb shall have a neoprene sponge seal at the top and be rigid enough to provide continuous perimeter support for rooftop unit. Curb must provide means to positively anchor to concrete deck, or bolt or weld directly to structural steel to withstand seismic loading. Curb shall provide a means by which contractor supplied insulation may be installed for thermal insulation and acoustic attenuation. Curbs shall accommodate roof pitch shown on drawings. Curb shall use minimum 18 gage galvanized steel and shall be designed with crossbracing required to withstand the greater of seismic forces (para 1.3.) and/or wind loading per local building code. Design must be certified by registered professional engineer in the employ of the manufacturer. Seismic curbs shall be Amber/Booth Type RTC. Seismic equipment rails shall be Imperial Metals Model MR-NC, 18" high.

PART 3 – EXECUTION

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.

INSTALLATION:

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. Locate isolation hangers as near the overhead support structure as possible. 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.

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.

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.

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.

Concrete anchor locations shall not be near edges, stress joints, or an existing fracture. All anchor bolts to steel shall be ASTM A307 or better

APPLICATION OF SEISMIC RESTRAINTS:

Isolated Equipment:

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.

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.

Rigidly Mounted Equipment:

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.

End of Section 230548

SECTION 230700 – HVAC INSULATION

PART 1 - GENERAL

WORK INCLUDED:

General Requirements: This section shall include all insulation as required for installation on all items as specified hereinafter and/or as indicated. All insulations shall be installed in a workmanlike manner by qualified workers in the employment of an independent insulation contractor. Costs of insulation shall be included as part of work by contractor as applicable to his section of work. No separate bid is to be included for insulation work.

Fire hazard classification for all material shall not exceed flame spread of 25 and smoke development of 50 as classified by Underwriters Laboratories under Test Method ASTM E-84 and acceptable under NFPA Standards. This is to apply to the complete system and be a composite rating of insulation material with jacket or facings, vapor barrier, joint sealing tapes, mastic and fittings.

Prior to commencing any work, submit data sheets for engineer's approval of all material proposed to be used on this project.

PART 2 - PRODUCTS

ABOVE GROUND INDOOR PIPING:

Pipe Insulation:

All water piping shall be insulated with heavy density fiberglass with all-service jacket Owens-Corning Double Self-Sealing Lap, ASJ/SSL-II, one piece, to be used on all lines above and below ambient temperature from 0°F to 850°F.

Refrigerant Pipe Insulation:

All refrigerant piping shall be insulated with heavy density fiberglass with all-service jacket Owens-Corning, or equal, Double Self-Sealing Lap, ASJ/SSL-II, one piece, to be used on all lines below ambient temperature to 0°F.

JACKET FOR EQUIPMENT ROOM PIPING:

All insulated piping in equipment rooms shall be covered with eight (8) ounce cotton canvas manufactured in the United States. All hot water piping shall be lagged with Childers CP-9, CP-10 or CP-11 Weather Barrier Coating, or equal. All chilled water piping shall be lagged with Childers CP-30 LO Solvent thinned Vapor Barrier Coating or CP-35 Water Based Vapor Barrier Coating, or equal.

JACKET FOR OUTDOOR PIPING:

All insulation outside (including insulation options) shall be protected with aluminum jacketing with factory applied moisture barrier. The aluminum jacketing shall be 0.016 thickness and be of 3003 alloy and H-14 temper. Jacketing shall be applied with 2-inch circumferential and 1-1/2 inch longitudinal lap and secured with 3/8 inch wide aluminum bands, 8 inches on center.

All elbows shall be covered with 2 piece aluminum insulation covers, manufactured from 110 aluminum alloy in .024" thickness, Childers Aluminum E11-Jacs or equal.

On hot service, aluminum elbows may be attached using self-tapping screws. On chilled water service, aluminum elbows shall be glued on pipe insulation.

PIPE INSULATION THICKNESS:

Piping for the following systems shall be insulated to the thickness listed:

<u>Item</u>	<u>Insulation Thickness (Inches)</u>
Fiberglass K = 0.24	
Cold Pipes:	
Condensate Drain Piping	1"
Refrigerant Suction	1-1/2"

DUCTWORK INSULATION:

Supply, Return, and Fresh Air Return Ducts in Equipment Rooms:

Insulation shall be 1-1/2 inch thick board equal to Owens Corning 705 (FRK) (ASJ).

Supply And Return Ducts 15 Feet From Air Handling Equipment:

Line all metal ducts with 1-1/2 pound density, 1 inch thick duct liner equal to Owens Corning Aeroflex PLUS. Liner shall meet requirements of ASTM C1338, G21 and G22 with respect to resistance to microbial growth.

EQUIPMENT INSULATION:

Hot Vessels (to 400°F)

Hot tanks and vessels operating at temperatures not over 400°F shall be insulated with the thickness of insulation board as outlined below. Insulation board shall be pre-formed, flat rectangular rigid material. Maximum K value shall be .24 at 75°F mean temperature.

All vessels storing fluids, or connected to systems containing fluids, at temperatures between 150°F to 400°F shall be insulated.

<u>Equipment</u>	<u>Insulation Thickness</u>
Expansion Tank and Air Release Tank	1"

PART 3 - EXECUTION

PIPE INSULATION:

All insulation shall be applied to clean, dry surfaces butting all sections firmly together and finishing as specified hereinafter.

All vapor barriers shall be sealed, and shall be continuous throughout. No staples shall be used on any vapor barrier jacket unless sealed with vapor barrier coating or vapor barrier tape.

Insulation of all insulated lines shall be interpreted as including all pipe, valves, fittings and specialties comprising the lines, except flanged unions and screwed unions on hot piping.

Where sectional insulation is not practical, the proper insulation cement or block insulation shall be utilized by forming it to the applied surface.

Pipe Insulation Protection: Direct contact between pipe and hangers shall be avoided. Hanger shall pass outside of a sheet metal protection saddle which shall cover a section of high density insulation (cellular glass or calcium silicate), of sufficient length to support the weight of the pipe without crushing the insulation. The vapor barrier shall be continuous behind the saddle or shall be lapped over the saddle and securely cemented thereto.

All pipe covering shall be furnished with self-seal lap and 3" wide butt joint strips. The release paper is pulled from adhesive edge, pipe covering closed tightly around pipe and self-seal lap rubbed hard in place with the blunt edge of an insulation knife. This procedure applied to longitudinal as well as circumferential joints. Staple all longitudinal and circumferential joints with 9/16" staples 6" on center and seal over all staples with Childers CP-30 vapor barrier coating. Care shall be taken to keep jacket clean as it is the finish on all exposed work. All adjoining insulation sections shall be firmly butted together before butt joint strip is applied, and all chilled water and cold water service lines shall have vapor barrier coating thoroughly coated to pipe at butt joints and at all fittings. All fittings, valve bodies, unions, and flanges shall be finished as follows:

To the hot insulated fittings, apply a tack coat of Childers CP-10 or CP-11 (use CP-35 on cold piping) at the rate of 2 gallons per 100 S.F. While the tack coat is still wet, a layer of 10 x 10 fiberglass reinforcing mesh shall be embedded with all fabric seams overlapped a minimum of 2". A finish coat, at a coverage rate of 4 gallons per 100 S.F. shall be applied, fully covering the reinforcing mesh.

Apply fiberglass inserts to all other hot fittings and cold water fittings in conjunction with Proto PVC Fitting Covers. Seal cold applications as recommended by the manufacturer.

APPLICATION VERTICAL VESSELS AND PIPE GREATER THAN 35" O.D.:

Insulation shall be furnished with a factory applied ASJ facing.

For application to piping and vessels operating between 0°F. and 55°F., apply a minimum 3" wide ASJ matching tape over the joints for proper vapor seal.

For application to piping and vessels operating between -50°F. and 0°F., apply a bead a CP-76 joint sealant before applying a minimum 3" wide ASJ matching tape over the joint for proper vapor seal.

ALUMINUM JACKET:

Jacketing shall be applied with 2-inch circumferential and 1-1/2 inch longitudinal lap and secured with 3/8 inch wide aluminum bands, 8 inches on center and at joints.

DUCTWORK INSULATION:

Board Insulation (External):

Board shall be applied by means of resistance welded mechanical fasteners or equal. Pins shall not be less than 3 inches in from each edge or corner of board and no more than 12 inches on center. Cut side

pieces of insulation to lap top and bottom and scribe board to fit irregular surfaces. Apply a three inch wide bank of Childers CP-30 LO or CP-35 Vapor Barrier Coating on all joints of insulation. While tack coat is still wet, embed 3-inch wide White 10 x 10 Fiberglass reinforcing mesh and recoat fully covering the mesh. Pins shall not protrude excessively above fastening washers. Spot all washers with Childers CP-30 LO and cover with material to match jacket.

Flexible Insulation (Internal):

Applications: Duct Liner shall be applied to the interior of metal ducts using Childers CP-121 HV Duct Liner Adhesive or an equal product having a flame spread of less than 25 and a smoke development of less than 50 and classified such by Underwriters Laboratories. Exposed edges of insulation shall be coated with a heavy layer of Childers CP-135 CHIL-SPRED to eliminate erosion of fibers.

When duct height or plenum walls exceed 24 inches and when duct widths exceed 12 inches, resistance welded mechanical fasteners will be used in addition to duct liner adhesive. Fasteners shall start within 3 inches of the upstream transverse edges of the liner and 3 inches from the longitudinal joints. Fasteners should be spaced a maximum of 6 inches on center around the perimeter of the duct, except that they may be a maximum of 6 inches from a corner break. Elsewhere they shall be a maximum of 18 inches on center.

Insulation shall extend the full length of each duct section to permit butting firmly at the duct joints. All joints shall be tightly sealed with CP-135.

EQUIPMENT INSULATIONS:

Equipment Insulation for Hot Vessels (to 400°F)

Insulation shall be cut and mitered where necessary to fit the contour of the vessel. For round vessels, insulation shall be banded in place with 1/2 inch x .020 stainless steel bands 18" on center. For flat or irregular vessels, insulation shall be impaled over weld pins and secured with speed washers. Apply a smoothing coat of One Shot Cement.

Apply a tack coat of Childers CP-10/11 Vinyl Acrylic Mastic on hot vessels by brush. Embed a layer of Childers CHIL-GLAS 5 (5 x 5 weave) reinforcing mesh into wet coating, smoothing to avoid wrinkles. A finish coat at a coverage of 4 gallons per 100 S.F. shall be applied fully covering the reinforcing mesh so that the minimum dry film thickness is 1/16 inch.

End of Section 230700

SECTION 260500 - ELECTRICAL BASIC MATERIALS AND METHODS

PART 1 - GENERAL REQUIREMENTS

1-01 SCOPE OF WORK

WORK INCLUDED: Furnish all necessary labor, material, plant and equipment, including materials and equipment not specifically mentioned but necessary to complete the work in a neat, correct, and workmanlike manner, to include:

- 1) Feeders, panelboards, and distribution equipment.
- 2) Complete branch circuit wiring system for lighting, receptacles, equipment, and outlets.
- 3) Lighting fixtures, wall switches, receptacles and outlets.
- 4) Line voltage connections to equipment furnished under other Sections of these specifications, including disconnects, where indicated.
- 5) Hangers and Supports for Electrical Systems, see Section 260529.
- 6) Vibration and Seismic Controls for Electrical Systems, see Section 260548.
- 7) Surge Suppression Device (SPD), see Section 264313.
- 8) Fire Alarm System, see Section 283100.

ALTERNATES No. 1, 2: State the Lump Sum amount to be added to the Base Bid for ***description***.

SPECIAL NOTE: The provisions of the Instructions to Bidders, General Conditions, Supplementary General Conditions and all applicable requirements of Division 1 shall govern the work under this Division the same as if incorporated herein.

1-02 EQUIPMENT WIRING

Furnish and install power circuits to and line voltage connections to all equipment furnished and installed by other trades, including disconnects, where indicated.

Furnish and install receptacles for equipment furnished with cord and plug, such as electric water coolers, kitchen equipment with cord and plug, computer and data processing equipment, portable welders, shop equipment, and other equipment indicated on the drawings.

CONTROL WIRING: Raceways, wiring, and control devices (thermostats, pressure switches, program clocks, etc) for HVAC control systems and other mechanical and plumbing systems shall be furnished and installed under Division 23, unless otherwise indicated on the drawings or specified in this Division.

ROOFTOP HVAC UNITS: Power circuits for rooftop HVAC units shall rise thru the inside of the HVAC unit curb into the bottom of the unit and out to the disconnect switch mounted on the unit. The Electrical Contractor shall coordinate this work closely with the Mechanical Contractor in the field to avoid conflicts with ductwork.

All Motor Starters and Variable Frequency Drives (VFDs) for HVAC-related equipment that are not factory-mounted shall be furnished by the Mechanical Contractor, installed and power wired by the Electrical Contractor unless noted otherwise on the design documents. Refer to Mechanical Drawings for locations and quantities of Motor Starters and VFDs.

VOLTAGE: The Electrical Contractor shall supply power to equipment at the voltage indicated on the electrical drawings. The Electrical Contractor and the other applicable trades will be held responsible for coordinating the equipment voltages, the control equipment wiring, and the location and type of disconnect required to comply with the equipment manufacturer's requirements, the National Electric Code, and applicable local building codes. IF EQUIPMENT IS SUPPLIED AT A

VOLTAGE OTHER THAN THAT PROVIDED, THE GENERAL CONTRACTOR AND SUBCONTRACTORS WILL BE HELD RESPONSIBLE FOR MAKING ANY NECESSARY ADJUSTMENTS TO CORRECT THE CONFLICT, AT NO COST TO THE OWNER, TO THE SATISFACTION OF THE ELECTRICAL ENGINEER.

1-03 EXISTING CONDITIONS

The Contractor will be held responsible for having visited the site and having familiarized himself with the existing conditions prior to submitting his bid.

1-04 COORDINATION

OTHER TRADES: All work under this Section shall be coordinated with other trades to insure proper location of outlets and equipment connections, and to minimize conflicts with structural members, duct work, piping, etc. Conflicts between equipment and/or material locations shall be corrected as directed by the Architect-Engineer at no additional cost to the Owner.

UTILITIES: The service locations, arrangement and metering for electrical and telephone service entrances shall be coordinated in detail with those utilities. All provisions necessary for these services shall be provided in the Electrical Contractor's bid, unless otherwise indicated.

1-05 CODES AND PERMITS

Installation and materials shall be in accordance with the applicable versions of the National Electrical Code, the International Building Code, and all local codes. Apply and pay for all permits and fees required for this construction.

1-06 DRAWINGS

The drawings and specifications shall be considered as complementary, one to the other, so that materials and labor indicated, called for, or implied by either shall be furnished and installed as if required by both. Where a disagreement exists between the plans and specifications, the item or arrangements of better quality, greater quantity, or higher cost shall be included in the base bid. Any discrepancies between the drawings, specifications, and field conditions shall be resolved with the Engineer prior to commencing work. All agreements shall be verified in writing.

RECORD DRAWINGS: The Contractor shall maintain one set of clean blueprints for "RECORD" drawings. All changes, revisions, or modifications to the project shall be recorded daily on these drawings with redline pencil. Upon completion of the project, these redline drawings shall be turned over to the Engineer for preparation of final Record Drawings.

1-07 MAINTENANCE AND OPERATING MANUALS

The Contractor shall furnish the Owner two (2) complete maintenance and operating manuals for each piece of equipment and material furnished under this project. These manuals shall be bound in hard cover binders with tabs for each section item or piece of equipment. The manuals shall be furnished to the Engineer prior to the final observation, and final acceptance shall not be given until the Owner's maintenance personnel are instructed in maintenance and operation of all systems.

1-08 GUARANTEE

All materials and labor furnished under this Section of the specifications shall be guaranteed by the Contractor to be free from defects for a period of one year from the date of acceptance. The Contractor shall repair or replace any deficiencies reported in the guarantee period promptly after notification, without any additional compensation from the Owner. Lamps are excluded from this warranty, except that all lamps shall be operational on the date of acceptance.

1-09 MATERIALS

UL LISTING: All materials shall be listed by Underwriter's Laboratories, or an approved equal testing laboratory, and shall bear the "UL" Label, where applicable.

SUBSTITUTIONS: 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-Engineer, expressed in writing prior to bidding as specified below, is equal to that herein named.

Requests to substitute materials or equipment considered by the Contractor as equal to those specified shall be submitted for review to the Architect-Engineer ten (10) 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 accepted. If the item is found to be equal, the Architect-Engineer will issue an Addendum making it a part of the Contract Documents prior to bidding.

1-10 SUBMITTALS

Electrical shop drawings shall be submitted in one complete package containing all items required by this specification and all other Division 26-28 specifications. Partial shop drawing submittals may be rejected by the Architect-Engineer.

Exceptions: Fire Alarm System CAD drawings, Lighting Control System CAD drawings, and Allowanced Light Fixtures may be submitted separately if additional time is needed to prepare these shop drawings.

Within 30 days after award of contract and before any materials are delivered to the site, submit one (1) digital set in pdf format and one (1) hard copy printed set to the Architect-Engineer on the following materials (partial/incomplete submittals may be rejected):

- 1) Section 260500 - Raceways, Fittings, and Surface Wiring Systems.
- 2) Section 260500 - Wire and Cable.
- 3) Section 260500 - Boxes and Wireways.
- 4) Section 260500 - Wiring Devices.
- 5) Section 260500 - Lighting Fixtures (Including Lamps and Ballasts).
- 6) Section 260500 - Allowanced Lighting Fixtures.
- 7) Section 260500 - Lighting Control Equipment (Contactors, Photocells, Time Clocks, Occupancy Sensors, Lighting Control Panels).
- 8) Section 260500 - Disconnect Switches, Panelboards, Switchboard, and Transformers.
- 9) Section 260500 - Floor Boxes.
- 10) Section 260500 - Cable Management.
- 11) Section 260500 - Fire Wall Penetration Assembly.
- 12) Section 260529 - Hangers and Supports for Electrical Systems (Including Engineer's calculations where required).
- 13) Section 260548 - Vibration and Seismic Controls for Electrical Systems.
- 14) Section 264313 - Surge Protection Device (SPD) Equipment.
- 15) Section 283100 - Fire Alarm Equipment and Drawings.

No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

The printed hard copy submittal shall be bound in a hardback binder with each submittal category tabbed separately. Each tab/divider shall include project name and name and address of firm or entity that prepared submittal.

Digital submittal to be pdf documents and shall mimic printed submittal in appearance and format.

Electrical submittal to include a separate transmittal letter indicating project name and address, date, contractor name and address, construction manager name and address (if applicable), list of submittals, and remarks, and signature of transmitter

Failure to comply with the above criteria may result in rejection of the submittal by the Architect-Engineer. Refer to Division 1 for additional Submittal requirements.

PART 2 - MATERIALS

2-01 RACEWAYS AND FITTINGS

GALVANIZED RIGID CONDUIT (GRC): UL 6 and ASA C80.1 with full weight screwed fittings. Bushings shall be malleable iron. Bushings 1 1/4" and larger shall have insulated throat and grounding lug.

INTERMEDIATE GRADE METALLIC CONDUIT (IMC): UL 1242, galvanized, with full weight screwed fittings. Bushings shall be as specified above.

ELECTRICAL METALLIC TUBING (EMT): UL 797 and ASA C80.3 with steel compression or set-screw type fittings. Die-cast fittings are not acceptable. Fittings 1 1/4" and larger shall have nylon insulated throat. Indented or drive-on fittings are not acceptable.

FLEXIBLE STEEL CONDUIT (GREENFIELD): UL 1. Fittings shall be steel.

LIQUIDTIGHT FLEXIBLE STEEL CONDUIT (SEALTITE): UL 360. Fittings shall be steel compression type.

PLASTIC CONDUIT (PVC): Schedule 40 polyvinylchloride. NEMA Standard TC-2 and TC-3 and UL Standards. Conduit, solvent, and fittings shall all be supplied by the same manufacturer. PVC is not permitted above grade.

SURFACE METAL RACEWAY (INDOOR): Wiremold V500 ivory surface metal raceway, or approved equal. Straps, boxes, elbows, etc. shall all be supplied by the same manufacturer. Total cross-sectional area shall be a minimum of 0.20 square inches.

TWO-PIECE DIVIDED SURFACE METAL RACEWAY SYSTEM: The raceway shall be of a two-piece design with a base and snap on cover. Assembled base and cover shall be a minimum of 4.75" wide by 1.75" high. Base shall be dividable by means of a removable barrier section into two equal compartments. Wiremold 4000 divided surface metal raceway system or approved equal. Wiremold 5000 or Panduit Twin-70 nonmetallic divided surface raceway systems may be used in lieu of specified metallic raceway system where acceptable to the Owner. Submit substitution request to Engineer for review 10-days prior to bid date.

- 1) Fittings: A full line of fittings must be available including but not limited to flat, internal and external elbows – including fiber ready 2" radius elbows, couplings for joining raceway sections, wire clips, blank end fitting and a full compliment of device mounting brackets and plates. The fittings shall be colored to match the raceway.

- 2) Devices: Device brackets shall be available to install single or two gang devices horizontal within the raceway. Both power and data/communications devices shall have the capacity of mounting flush. Device brackets and plates shall be colored to match the raceway.
- 3) Data Devices: The raceway manufacturer will provide a complete line of connectivity outlets and modular inserts for UTP (including Category 5e), STP (150 ohm) Fiber Optic, Coaxial and other cabling types with faceplates and bezels to facilitate mounting. A complete line of preprinted station and port identification labels, snap-in icon buttons as well as write-on station identification labels shall be available.
- 4) Details: See Details on the Drawings for device requirements.

2-02 WIRE AND CABLE

UL STANDARDS: UL 44 and UL 83.

CONDUCTOR: Copper, soft drawn, per ASTM B3. Sizes No. 12 and 10 shall be solid conductor. Sizes No. 8 and larger shall have Class B concentric stranding per ASTM B8. Stranded conductors may not be used on No. 12 and No. 10 circuits.

INSULATION: 600 Volt, 75 Deg C rated. Type THHN-THWN-MTW, unless noted otherwise.

SPLICING MATERIALS:

- | | |
|---------------------|---|
| No. 10 and smaller: | Acceptable wire nuts or insulated crimped splice caps. |
| No. 8 and larger: | Bronze or copper split bolts, or tinned compression connectors.
(Polaris insulated splice blocks may not be used on this project). |

Insulation shall be Scotch No. 23 rubber tape and Scotch No. 33 plastic tape, or approved equivalent method.

2-03 BOXES AND WIREWAYS

OUTLET BOXES: Galvanized sheet steel per UL 514. "Through-wall" boxes SHALL NOT BE USED. Back-to-back mounting of boxes is not permitted. All outlet boxes 4"x4" or smaller located on opposite sides of a rated wall shall have a minimum of 24" horizontal spacing or shall be protected with listed putty pads. All outlet boxes larger than 4"x4" (communications outlets, etc.) located in rated walls shall be protected with listed putty pads.

Box sizes shall be as follows:

- 1) Wall Receptacle Outlets: 4" square by 2 1/8" deep with plaster ring as required.
- 2) Wall Communications and Computer Outlets: 4 11/16" square by 2 1/8" deep with one gang plaster ring. Provide box with 1 1/4" conduit knockouts.
- 3) TV Wall Outlets: 4 11/16" square by 2 1/8" deep with one gang plaster ring. Provide box with 1 1/4" conduit knockouts.
- 4) Ceiling outlets: 4" square or octagonal by 1 1/2" or 2 1/8" deep with stud or ears where required for fixture support.
- 5) Indoor Surface Mounted Outlets: Wiremold V5744S-2 surface metal box unless noted otherwise on the drawings (steel boxes and EMT conduit may be used in equipment rooms, janitor's closets, storage rooms).
- 6) Exposed Outlets: Malleable iron or heavy duty cast aluminum with threaded hubs, Type FS, FD, or GS. Manufactured by Crouse Hinds, Appleton, Killark, or approved equal. Die cast boxes are not acceptable.

WIREWAYS, PULL BOXES AND JUNCTION BOXES: UL 50. Code gage galvanized sheet steel, aluminum, or steel primed and painted after fabrication. Manufactured by Square D, Austin Berryhill, Hoffman Engineering, B-Line Systems, or approved equal. Wireways shall have hinged covers.

2-04 WIRING DEVICES

MANUFACTURERS: All wiring devices shall be Hubbell Extra Heavy-Duty Specification Grade Series or equivalent of Arrow Hart Premium Industrial Spec Grade, Pass and Seymour Heavy-Duty Spec Grade, or Leviton Industrial Spec Grade, unless specifically noted otherwise. If devices not meeting the specifications are supplied, they shall be removed, discarded, and new devices meeting the specification shall be furnished & installed by the Electrical Contractor at no cost to the Owner or the Engineer.

RECEPTACLES: 20A, 125V, 3 wire grounding, NEMA 5-20R, side and back wired, with impact resistant nylon face and standard color as selected by Architect.

- "TR" denotes Tamper-Resistant receptacle. Tamper Resistant receptacles shall be listed Tamper-Resistant receptacles per NEC Article 406.11, typical for receptacles in Dwelling Units, Kindergartens, and Childcare Areas.
- "CR" denotes indoor Corrosion Resistant receptacle. Indoor Corrosion Resistant receptacles shall be listed Weather/Corrosion Resistant receptacles per NEC Article 406.8.
- "WP" denotes weatherproof receptacle. Weatherproof receptacles shall be listed Weather/Corrosion Resistant receptacles per NEC Article 406.8 and shall include a wet location cover.

- 1) Duplex Receptacle: Hubbell HBL-5362-X
- 2) Duplex Receptacle, Tamper Resistant (NEC 406.11): Hubbell HBL-5362-X-TR
- 3) Duplex Receptacle, Corrosion Resistant (NEC 406.8): Hubbell HBL-5362-X-WR
- 4) Single Receptacle: Hubbell HBL-5361-X
- 5) Isolated Ground Duplex Receptacle: Hubbell IG-5362-X

GFCI RECEPTACLES: Feed Thru type, 20A, 125V, NEMA 5-20R, standard color as selected by Architect. All GFCI Receptacles shall be listed Tamper Resistant (NEC 406.11) and Weather Resistant (NEC 406.8).

- 1) GFCI Duplex Receptacle: Hubbell GFR-5362-X-TR
- 2) Faceless GFCI: Hubbell GFBF20-X-L

SWITCHES: 20A, 120/277V, side and back wired, ivory color. Single pole, double pole, three way, or four way, as indicated on the drawings. Standard color as selected by Architect.

- 1) Single Pole Switch: Hubbell HBL-1221-X
- 2) Double Pole Switch: Hubbell HBL-1222-X
- 3) Three Way Switch: Hubbell HBL-1223-X
- 4) Four Way Switch: Hubbell HBL-1224-X

SPECIAL RECEPTACLES: Specification grade, rating as specified on the drawings.

COVER PLATES: Provide plates to suit the devices.

- 1) Finished interior walls: Jumbo Stainless Steel.
 - Receptacles noted on drawings as dedicated for computers shall include a factory engraved jumbo stainless steel coverplate labeled "COMPUTER". See Electrical Symbols and Power Plans on drawings to identify dedicated computer receptacle.
- 2) Exposed outlets: Galvanized steel.
- 3) Wet locations: Weatherproof "In Use" type for wet location areas, hinged weatherproof type for damp location covered areas.

2-05 INTERIOR LIGHTING

FIXTURE SCHEDULE: See Drawings.

PRE-PAINTED STEEL: Fixture bodies manufactured from pre-painted steel shall be painted after fabrication, unless noted otherwise on the drawings.

ELECTRONIC FLUORESCENT BALLASTS: As manufactured by Universal Lighting Technologies, or approved equal. See drawings for ballasts specifications. All fluorescent ballast shall include a disconnect plug designed in accordance with NEC 410.73(G).

T8 FLUORESCENT LAMPS: Low Mercury, high CRI, high lumen output, 95% lumen maintenance. Phillips ALTO II Series or approved equal. See drawings for lamp specifications.

LED LAMPS AND DRIVERS: Refer to Lighting Fixture Schedule and Lighting Fixture Schedule Notes on Drawings.

LENSES: Virgin acrylic plastic. Nominal thickness of fluorescent fixture lenses shall be 0.125" unless noted otherwise.

EMERGENCY LIGHTING (BATTERY BACKUP): Self-contained emergency lighting for fluorescent fixtures shall have a minimum of 1400 Lumens output for 90 minutes. All emergency batteries shall be sealed, maintenance-free, high temperature nickel cadmium batteries unless noted otherwise.

2-06 EXTERIOR LIGHTING

LUMINAIRES: Luminaires shall be lamp type, wattage, style, and manufacturer as specified in the fixture schedule on the drawings.

2-07 LIGHTING CONTROLS

LINE VOLTAGE TIME CLOCK: 7 day, two-channel, 120 volt electronic programmable time control with two SPDT contacts, NEMA 1 case, 24-hour clock format, leap year correction, and daylight saving time adjustment. Paragon EC72/120, or equal of Intermatic or Tork.

2-08 SAFETY SWITCHES AND FUSES

SWITCHES: NEMA Standard HD, heavy-duty type, 3 pole, 480 or 240 volt, as indicated, with Class R fuse clips. Manufactured by Square D, General Electric, Cutler Hammer, or Siemens.

FUSES: Time delay type, UL Class RK5. Bussman Fusetrons, or approved equal of Chase-Shawmut or General Electric.

NAMEPLATE: Provide engraved nameplate for each safety switch identifying load served, voltage, and fed-from identification. Example:

**AHU-1, 480-3-60
FED FROM HA-15**

2-09 PANELBOARDS

STANDARDS: UL 67 and NEMA PB-1.

MANUFACTURERS: Square D, General Electric, Cutler Hammer, or Siemens.

CONSTRUCTION: Code gage cabinet with clamping trim cover and locking doors, keyed alike. Cabinets shall be minimum 20" wide. Busses shall be for bolt-in breakers with full sized neutral bus. Provide ground bus in each panelboard.

ENCLOSURE: Flush or surface mounted, NEMA 1, NEMA 3R, or NEMA 4X as indicated on drawings.

- 1) Front: Surface-mounted fronts, match box dimensions; Flush-mounted fronts, overlap box.
- 2) Directory Card: Inside panelboard door, mounted in metal frame with transparent protective cover. Provide typewritten circuit directory for each panel identifying load served and room location. Identify spares in pencil.
- 3) Panels and Trim Finishes: Galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two (2) coat, baked-on finish consisting of prime coat and thermosetting topcoat.
- 4) Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
- 5) Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.

CIRCUIT BREAKERS: Molded case bolt in type. Breakers shall be rated for the specified panelboard interrupting capacity rating in RMS symmetrical amperes. Two and three pole breakers shall have common internal trip. Branch mounted main breakers are not permitted unless specifically noted on the drawings.

BREAKER COORDINATION: Manufacturer shall provide coordination between feeder breakers and upstream devices. These coordination settings shall be made in the field by a manufacturer's field technician and documented. A letter confirming the setting and providing the setting information shall be provided prior to energization of the switchboard.

NAMEPLATE: Provide engraved nameplate for each panel identifying panel name, voltage, phase, and fed-from identification. Example:

**PANEL HA
480/277V, 3PH
FED FROM MSB-2**

2-10 MAIN SWITCHBOARD

MANUFACTURERS: Square D, General Electric, Cutler Hammer, or Siemens in accordance with UL standard 891 and NEMA standards. The manufacturing facility shall be registered by Underwriters Laboratories Inc. to the International Organization for Standardization ISO 9002 Series Standards for quality.

CONSTRUCTION: Dead front, NEMA Class II, indoor construction, front and rear accessible, finished light gray enamel. Devices in distribution section shall be grouped mounted. All sections shall be front and rear aligned. Each switchboard section shall have an open bottom and an individually removable top plate for installation and termination of conduit.

PAD: Mount switchboard on 6" concrete pad per manufacturer's recommendations. Pad shall extend 4" beyond transformer on all sides. Pad shall have 3/4" chamfer on all sides.

SEISMIC: Provide switchboard constructed to withstand seismic forces specified in Section 260548 "Vibration and Seismic Controls for Electrical Systems." Fasten switchboard to pad per the manufacturer's instructions.

BUSSES: Tin plated copper, rated 1000 Amps per square inch. The switchboard bussing shall meet UL Standard 891 temperature rise requirements. Neutral bus shall be half sized. Ground bus shall be 1/4" by 2" copper, extending thru all sections.

SHORT CIRCUIT RATING: Switchboards shall be rated with a minimum short circuit current rating of 65,000 rms symmetrical amperes at 480 VAC maximum.

MAIN BREAKER: Fixed mounted stored energy power circuit breaker, rated 65,000 AIC RMS symmetrical at 480V with solid state trip unit, Square D Type, or approved equal. Circuit breaker shall be two-step stored energy type circuit breaker type SE, UL Listed for 100% continuous current. Sensor (frame) ampere ratings shall be as shown on the drawings. Provide a fixed instantaneous (High Level Selective Override) circuit on breaker(s). The circuit shall have a defeatable instantaneous adjustment to allow the breaker to remain closed for up to 30 cycles during overcurrents below the rms symmetrical short time withstand ratings. The circuit shall instantaneously trip when current levels exceed applicable withstand ratings. Breaker faceplate shall indicate rated ampacity. Breaker faceplate shall indicate UL and IEC certification standards with applicable voltage systems and corresponding AIC ratings. Circuit breaker shall be equipped with a push-to-trip button to mechanically operate the circuit breaker tripping mechanism. Provide true two-step stored energy mechanism for 5 cycle closing. Energy required to close breaker shall be stored pending release to close action. All circuit breakers shall have multiple CHARGE/CLOSE provisions allowing the following sequence: CHARGE, CLOSE, RECHARGE, OPEN/CLOSE/OPEN. Furnish local control push buttons to OPEN and CLOSE circuit breaker. Color coded visual indication of contact position (OPEN or CLOSED) shall be provided on the front of the breaker. Provide for local manual charging following CLOSE operation. Color-coded visual indication of mechanism CHARGED and DISCHARGED position shall be provided on the face of the breaker. Visual indicator shall indicate CHARGED only when closing springs are completely charged.

ELECTRONIC TRIP SYSTEM: The entire trip system shall be a microprocessor-based, true rms sensing design with sensing accuracy through the 13th harmonic. MICROLOGIC full function by Square D or approved equal is acceptable. Provide the following time/current curve shaping adjustments to maximize system selective coordination. Each adjustment shall have discrete settings and each function is independent from all other adjustments.

- Adjustable Long Time Ampere Rating and Delay
- Adjustable Short Time Pickup and Delay (delay includes I^2t IN and I^2t OUT)
- Adjustable Defeatable Instantaneous Pickup (with OFF position)
- Adjustable Ground Fault Pickup and Delay (delay includes I^2t IN and I^2t OUT)
- High Level Selective Override

Each SE type circuit breaker trip unit shall be capable of communicating the following data via a high speed network (19.2k Baud).

- Phase current of A, B, and C phases and ground fault in real-time.
- Switch settings:
 - Long-time settings: pickup and delay
 - Short-time settings: pickup and delay
 - Instantaneous settings
 - Ground fault settings: pickup and delay

EQUIPMENT GROUND FAULT PROTECTION: Circuit breaker(s) shall be provided with integral equipment protection. The ground fault system shall be of the residual type. Each shall provide Adjustable Ground Fault Pickup and Delay (delay includes I^2t IN and I^2t OUT)

INSTRUMENTATION: Provide full scale, panel type ammeter, complete with four position selector switch and current transformers. Provide full scale, panel type voltmeter, complete with seven-

position selector switch and potential transformers. Electronic power meter providing voltmeter, ammeter, power meter, VAR meter, and power factor functions for each phase will be acceptable.

BRANCH FEEDER BREAKERS: Molded case circuit breaker, rated 65,000 AIC RMS symmetrical at 480V, and type as specified on the drawings. Where space is called for, all necessary bussing, device supports, and connection shall be furnished. Circuit breaker(s) shall be group mounted. Each breaker shall be provided with integral equipment ground fault protection with adjustable ground fault pickup and delay time functions.

FUTURE PROVISIONS: All unused spaces provided shall be fully equipped for future devices, including all appropriate connectors and mounting hardware.

SURGE CAPACITOR: Capacitor shall be General Electric 9L18ABB301, or approved equal.

NAMEPLATES: Provide engraved nameplate for switchboard identifying job name, Electrical Contractor's name and telephone number, panel name, voltage, and phase. Provide each breaker with an engraved nameplate to identify the load served, voltage, and phase. Plates shall have 1/4" white letters on black field.

BREAKER COORDINATION: **Manufacturer shall provide coordination between feeder breakers and upstream devices. These coordination settings shall be made in the field by a manufacturer's field technician and documented. A letter confirming the setting and providing the setting information shall be provided prior to energization of the switchboard.**

SHOP DRAWINGS: Shop Drawings shall indicate front and side enclosure elevations with overall dimensions shown; conduit entrance locations and requirements; nameplate legends; one-line diagrams; equipment schedule; and switchboard instrument details.

2-14 NAMEPLATES

NAMEPLATE: Provide engraved 3-ply laminated plastic nameplates for each panelboard, safety switch, transformer, enclosed circuit breaker, contactor, and lighting control panel. Attach to equipment cover using metal screws, rivets, or industrial epoxy cement. Manufacturer's sticky-back adhesive is not acceptable. Use 1/4" white letters on black field for normal power items. Use 1/4" white letters on red field for emergency power items (generator).

PART 3 - EXECUTION

3-01 GENERAL REQUIREMENTS

WORKMANSHIP: All work shall be installed in a neat and orderly manner. Devices, cabinets, covers, fixtures, exposed raceways, etc., shall be aligned parallel or perpendicular to the building walls, ceiling, and floor. Wiring in panelboards and cabinets shall be neatly looped and laced, and not wadded. The Owner reserves the right to require repair or replacement of defective workmanship and material without additional compensation to the Contractor.

SUPPORTS: Conduits, boxes, cabinets, enclosures, lighting fixtures, etc., shall be securely supported by structural members or structural walls at intervals required by the NEC or as recommended by the manufacturer. Plaster, gypsum board, acoustical tile, and other ceiling and wall finish materials shall not be used for support.

Recessed fluorescent, incandescent, and H.I.D. fixtures and recessed ceiling speakers shall be independently supported by two (2) or four (4) #12 steel hanger wires. Hanger wires shall be hung within 10 degrees of plumb, and shall be securely tied to structural members such as steel joists or beams, or to steel angles or tubing which bridge structural members.

CUTTING, PATCHING, AND PAINTING: The Electrical Contractor shall perform all boring, drilling, and cutting of walls, ceilings, and floors as required to install and support his raceways and equipment. Provide rough patching to seal penetrations through walls, ceilings, and floors. Finish patching and painting will be performed by the General Contractor.

FIRE WALL PENETRATIONS: Penetrations through fire rated walls and floors shall be sealed to maintain the integrity of the fire rating. Raceways through penetrations shall be in metal raceways. Penetration openings shall be sealed after the installation of the raceway with UL-49 listed fire retardant material, as manufactured by Chase Technology, 3M, Hilti, or approved equal. Penetrations shall be sealed in accordance with UL-49 requirements and the manufacturer's instructions. Coordinate manufacturer with the General Contractor so that all trades on the project use the same manufacturer.

Where cable trays and/or signal cables penetrate rated walls the Electrical Contractor shall furnish and install a UL Listed rated assembly, Specified Technology, Inc. (STI) EZ-Path Triple Cable Pathway System, or equivalent system by Wiremold or Cooper. See details on drawings.

ROOF PENETRATIONS: Do not penetrate roof or flashing unless permitted, in writing, by the Architect-Engineer.

TRENCHING AND BACKFILL: The Electrical Contractor shall perform all excavation, trenching, and backfilling necessary to install his work. Trenches shall be run after final grades are established, and shall be run at 24 inches minimum depth from finished grades. Contact all underground utilities (electric, telephone, cable TV, gas, water, sewer) and establish locations of underground utilities prior to digging. Damages to underground utilities will be repaired by the Owner of the line, and the Contractor responsible for such damage will pay all costs of repairs. After completion of backfilling operations, restore the disturbed areas to their original condition by leveling, raking, seeding and mulching.

3-02 GROUNDING

CODE: Entire system shall be grounded and bonded in accordance with the requirements of Article 250 of the National Electrical Code.

MAIN SERVICE: Electrical service shall be grounded to the building structural steel, to the main cold water pipe within 5-feet of entrance to the building (or to the nearest indoor metal water piping when the main is PVC), and to driven ground rods as required by the National Electrical Code. Grounding point shall be inside the Main service equipment.

FEEDERS AND BRANCH CIRCUITS: Each feeder raceway shall be bonded to every cabinet, pull box, etc., to which it is connected by grounding bushings and bonding jumpers sized per NEC Table 250.122. Each branch circuit raceway must be connected to every cabinet, pull box, outlet box, etc., with double locknuts. Separate grounding conductors shall be installed on all feeders and on all lighting, receptacle and equipment branch circuits, whether indicated on the drawings or not. Size per NEC 250.122.

RECEPTACLES AND FIXTURES: Bond grounding terminal of each receptacle and fluorescent fixture to its outlet box with No. 12 green ground wire. Self-grounding receptacles are not acceptable as a substitute for this requirement.

DRY-TYPE TRANSFORMERS: Bond transformer secondary to building steel with full sized equipment grounding conductor per NEC Table 250.66.

3-03 RACEWAYS

WIRING: All wiring shall be installed in raceways, unless noted. Raceways shall be run concealed, unless noted.

MAIN SERVICE: Shall be run in GRC where run exposed or concealed in walls or ceilings, and shall be run in GRC or Schedule 40 PVC encased in concrete with 2-inches minimum concrete encasement on all sides where run underground. Schedule 40 PVC is not required to be encased in conduit where run under the concrete floor slab. Where PVC is used, elbows for turn-outs and risers shall be GRC. PVC is not permitted above grade.

FEEDERS: Shall be run in GRC or IMC where run exposed, shall be run in GRC, IMC, or EMT where run concealed in walls or ceilings, and shall be run in GRC, IMC, or concrete encased PVC with 2-inches minimum concrete encasement where run underground. Schedule 40 PVC is not required to be encased in conduit where run under the concrete floor slab. Where PVC is used, elbows for turn-outs and risers shall be GRC or IMC. PVC is not permitted above grade.

BRANCH CIRCUITS: Branch circuits shall be run concealed where practical.

Branch circuits run exposed to weather on exterior walls or on roofs shall be run in GRC or IMC with screwed fittings. Branch circuits run concealed in walls or ceilings shall be run in EMT, GRC, or IMC. Branch circuits run exposed in dry, finished spaces shall be run in Wiremold surface metal raceway. Branch circuits run exposed in damp locations, unfinished spaces (attics), and unoccupied spaces (storage room, equipment rooms, janitor's closet) may be run in EMT in lieu of Wiremold.

Branch circuits run underground shall be run in GRC, IMC, or Schedule 40 PVC plastic conduit. Underground conduits shall be run 24" minimum below grade. Metal conduits installed in contact with earth shall be painted with 2 coats Rustoleum paint or other acceptable preservative. Where plastic conduits are indicated, transition from plastic to GRC or IMC below grade or slab and rise with GRC or IMC. PVC is not permitted above grade. EXCEPTION: Plastic conduit may enter floor mounted switchboards.

FLEXIBLE CONDUITS: Recessed fluorescent and incandescent fixtures located in accessible ceilings may be connected to an outlet box above the ceiling thru flexible conduit "whips". Run a separate ground wire in all conduit, including flexible fixture whips. DO NOT loop flexible conduit from one fixture to another. Metal-clad cable fixture whips shall be permitted for light fixture whips provided they do not exceed 6-feet in length and are provided by the light fixture manufacturer.

Final connections to motors, motor driven equipment, transformers, and vibrating equipment shall be made thru flexible conduit, 36" maximum length. "Sealtite" flexible metal conduit shall be installed outdoors, in equipment rooms, and in wet locations.

PULL WIRES: Raceways for wiring by others or for future shall contain a No. 14 galvanized steel pull wire or equivalent plastic cord with 200 lb. tensile strength.

INSTALLATION: Ream raceways, butt ends into couplings, 3 quarter bends per run maximum, plug raceways until wiring is pulled in place. Exposed conduits shall be run parallel and perpendicular to walls, floor, and ceiling. Multiple conduit runs shall be racked using Unistrut or Kindorf channels and pipe clamps. Install conduits in concrete slabs between the top and bottom layers of reinforcing steel. Maximum size of conduits in slabs is 1 inch. Crossing of conduits in slabs shall be avoided, if possible.

PULL BOXES: Maximum length between pull points shall be 200 ft. for pulls with two 90 degree bends, and 100 ft for pulls with three 90 degree bends. Furnish and install pullboxes, junction boxes, handholes, or conduit bodies where bends or pulling lengths exceed these specifications.

EXPANSION JOINTS: Furnish and install expansion joints where conduit crosses building expansion joints and for straight runs exceeding 100 ft. in length.

PLASTIC CONDUIT: Do not damage conduit while making field bends and offsets, cutting and joining conduit. Use GRC elbows where length between pulls exceeds 100 ft. Clean conduit prior to applying solvent. Insure that conduit extends fully into coupling or fitting when making joints.

MINIMUM SIZE: Home runs to panelboards shall be 3/4" minimum, otherwise raceways shall be 1/2" minimum, except that flexible conduit shall be 3/8" minimum.

3-04 WIRE AND CABLE

MINIMUM SIZE: No. 12 for power circuits, No. 14 for control circuits, unless noted. Where home run exceeds 75 ft. length on 120 volt circuits, use No. 10 minimum.

COLOR CODE: No. 12 and No. 10 shall have color-coded insulation. No. 8 and larger shall be marked at all terminals and joints with color-coded tape. Color code as follows:

<u>Voltage</u>	<u>Phase A</u>	<u>Phase B</u>	<u>Phase C</u>	<u>Neutral</u>	<u>Grounding</u>
240/120	Black	Orange	Blue	White	Green
208/120	Black	Red	Blue	White	Green
480/277	Brown	Orange	Yellow	Gray	Green

INSTALLATION: Insure that raceway system is complete and that conductors will be free from moisture or physical damage prior to installing conductors. Install all conductors at the same time. Do not exceed cable manufacturer's recommended pulling tension for conductors. Where required, lubricate cables with Ideal Yellow 77, Burndy Slikon, or other acceptable cable lubricant. Do not use lubricants that are not acceptable to the Architect-Engineer.

SPLICING: Splices on Sizes No. 10 and smaller shall be made with wire nuts. Splices on Sizes No. 8 and larger shall be made with split bolt connectors, compression connectors, or solderless lugs. Splices shall be insulated with two or more layers of Scotch 23 rubber tape covered with two or more layers of Scotch 33 plastic tape, or acceptable equivalent method.

MULTIWIRE BRANCH CIRCUITS: Shared or common neutrals are not permitted on this project for multiwire branch circuits. The Contractor shall pull a separate neutral for all 120V & 277V circuits.

3-05 BOXES

WALL OUTLETS: Flush mounted, unless noted. Boxes shall be securely mounted to wall studs or be grouted in masonry. Boxes shall have single or multi-gang plaster rings, as required. "Through-wall" boxes **SHALL NOT BE USED**. Back-to-back mounting of boxes is not permitted. Boxes on opposite sides of a rated wall shall have a minimum of 24" horizontal spacing or shall be protected with listed putty pads.

CEILING OUTLETS: Flush mounted or concealed above ceiling. Boxes for fixture support shall have studs or ears as required and shall be securely supported by adjustable bar hangers or steel angle.

JUNCTION BOXES, PULL BOXES, AND WIREWAYS: Shall be sized and installed as indicated on the drawings or where required by NEC for pulling or splicing wiring. All junction boxes and pull

boxes shall be accessible. Junction boxes and pull boxes shall not be located above inaccessible ceilings.

LOCATIONS: Verify door swings and mount switches on strike side, 6" from jamb. Verify counter heights and arrangement prior to setting boxes. The Owner reserves the right to move any outlet by as much as 10 ft. from its indicated location at no additional cost, provided the Contractor is notified prior to roughing in.

3-06 WIRING DEVICES

INSTALLATION: Devices shall be installed as indicated on the drawings and wired in accordance with the manufacturer's instructions.

MASKING: Devices shall be masked to prevent painting of faces and handles during construction. Do not install cover plates until clean up has been completed.

COVER PLATES: Cover plates shall be installed on all wiring devices, telephone and computer outlets, junction boxes, and outlet connections.

3-07 PANELBOARDS

INSTALLATION: Mount top of panelboards 6'-6" above floor. Connect circuits as indicated on the drawings, observing correct color code and numbering. Mark all wires in panelboard with circuit number.

DIRECTORY: Provide typewritten circuit directory for each panel identifying load served and room location. Identify spares in pencil.

3-08 SAFETY SWITCHES

LOCATION: Mount switches where shown on drawings and within sight of equipment served. Mount in a readily accessible location unless noted. Verify fuse sizes with equipment manufacturer's requirements.

3-09 INTERIOR LIGHTING

LOCATION: Install fixtures symmetrically on ceiling or ceiling grid as indicated on the drawings and as directed on the job.

MOUNTING: Support all fixtures securely from structural or framing members with adjustable bars, metal angles, threaded rods or other acceptable methods. Installation shall comply with NEC 314.27. Support recessed fixtures as specified in paragraph 3-01.

Suspended linear fluorescent direct/indirect fixtures in classrooms, offices, conference rooms, and other finished interior spaces shall be suspended using aircraft cable as indicated on the drawings, unless noted otherwise.

Suspended industrial fixtures, high-bay fixtures, low-bay fixtures, etc. located in gymnasiums, warehouses, industrial facilities, and other larger spaces with exposed ceilings shall be suspended using threaded rods and the Electrical Contractor shall furnish and install unistrut or other structural member as required to support fixtures. Mount so bottom of fixture is as close to bottom of beam or truss as possible, unless noted otherwise.

3-10 EXTERIOR LIGHTING

LUMINAIRES. Luminaires shall be installed and leveled in accordance with the recommendations of the manufacturer and as indicated on the drawings. Luminaires shall be thoroughly cleaned after completion of installation.

3-15 COMPLETION OF WORK

TESTS AND FINAL REVIEW: Upon completion of work, the entire system shall be completely operational and tested to conform with these specifications and drawings, and shall be reviewed by the Architect-Engineer. All defects in workmanship and material shall be immediately corrected without additional compensation to the Contractor.

The final review of the electrical installation by the Engineer cannot be provided until the following items have been submitted to the Engineer for review:

- 1) Letter from the Electrical Contractor on company letterhead indicating that the installation is complete and ready for a final review.
- 2) Breaker Coordination letter confirming the setting and providing the setting information of circuit breakers in accordance with the design documents.
- 3) Signed and dated certificate indicating that the specified functional tests of the Fire Alarm System have been performed.

Failure to submit the above documentation prior to requesting the Engineer's Final Review of the project may result in delays in providing the final review. The Engineer assumes no liability for delays in the project resulting from failure to provide the proper documentation.

The system will not be considered complete until Record Documents are provided and training of facility personnel on the system operation is complete. This facet of the services to be provided by the Contractor is deemed very important to the satisfactory completion of the contract and the installation cannot be deemed complete until these services have been provided in accordance with the Contract Documents.

CLEAN UP: Upon completion of all installations and prior to final acceptance by the Owner, remove all debris from the site. Clean and touch up paint on fixture lenses and trims, cabinets, enclosures, cover plates, etc.

END OF SECTION 260500

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL REQUIREMENTS

1-01 SUMMARY

SECTION INCLUDES:

- 1) Hangers and supports for electrical equipment and systems.
- 2) Construction requirements for concrete bases.

1-02 PERFORMANCE REQUIREMENTS

- 1) Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- 2) Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- 3) Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- 4) Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1-03 SUBMITTALS

- 1) Product Data: For steel slotted support systems.
- 2) Shop Drawings: Shop Drawings shall be signed and sealed by a qualified professional engineer and shall show fabrication and installation details and include calculations for the following:
 - a. Trapeze hangers. Include Product Data for components.
 - b. Steel slotted channel systems. Include Product Data for components.
 - c. Equipment supports.
- 3) Welding Certificates.

1-04 QUALITY ASSURANCE

- 1) Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- 2) Comply with NFPA 70.

PART 2 - PRODUCTS

2-01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- 1) Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - i. Allied Tube & Conduit.
 - ii. Cooper B-Line, Inc.; a division of Cooper Industries.
 - iii. ERICO International Corporation.
 - iv. GS Metals Corp.
 - v. Thomas & Betts Corporation.
 - vi. Unistrut; Tyco International, Ltd.
 - vii. Wesanco, Inc.
 - c. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - d. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 - e. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - f. Channel Dimensions: Selected for applicable load criteria.
- 2) Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- 3) Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- 4) Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- 5) Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- 6) Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
- a. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - i. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - ii. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - Hilti Inc.
 - ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - MKT Fastening, LLC.
 - Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
 - b. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - i. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - ii. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - Cooper B-Line, Inc.; a division of Cooper Industries.
 - Empire Tool and Manufacturing Co., Inc.
 - Hilti Inc.
 - ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - MKT Fastening, LLC.
 - c. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.

- d. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
- e. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
- f. Toggle Bolts: All-steel springhead type.
- g. Hanger Rods: Threaded steel.

2-02 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- 1) Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- 2) Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3-01 APPLICATION

- 1) Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- 2) Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- 3) Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - a. Secure raceways and cables to these supports with two-bolt conduit clamps.
- 4) Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3-02 SUPPORT INSTALLATION

- 1) Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- 2) Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- 3) Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).
- 4) Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - a. To Wood: Fasten with lag screws or through bolts.
 - b. To New Concrete: Bolt to concrete inserts.
 - c. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - d. To Existing Concrete: Expansion anchor fasteners.
 - e. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.

- f. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts; beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69; or spring-tension clamps.
 - g. To Light Steel: Sheet metal screws.
 - h. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.
- 5) Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3-03 INSTALLATION OF FABRICATED METAL SUPPORTS

- 1) Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.
- 2) Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- 3) Field Welding: Comply with AWS D1.1/D1.1M.

3-04 CONCRETE BASES

- 1) Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- 2) Use 3000-psi, 28-day compressive-strength concrete.
- 3) Anchor equipment to concrete base.
 - a. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - b. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - c. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3-05 PAINTING

- 1) Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- 2) Touchup: Comply with requirements in Division 09 for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- 3) Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260548 - VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL REQUIREMENTS

1-01 SUMMARY

SECTION INCLUDES:

- 1) Isolation pads.
- 2) Spring isolators.
- 3) Restrained spring isolators.
- 4) Channel support systems.
- 5) Restraint cables.
- 6) Hanger rod stiffeners.
- 7) Anchorage bushings and washers.

1-02 PERFORMANCE REQUIREMENTS

- 1) Seismic-Restraint Loading:
 - a. Site Class as Defined in the IBC: **D**.
 - b. Assigned Seismic Use Group or Building Category as Defined in the IBC: **I**.
 - i. Component Importance Factor: **1.0**.
 - ii. Component Response Modification Factor: **2.5**.
 - iii. Component Amplification Factor: **2.5**.
- 2) Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- 3) Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- 4) Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1-03 ACTION SUBMITTALS

- 1) Product Data: For the following:
 - a. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
 - b. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.
 - i. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency acceptable to authorities having jurisdiction.
 - ii. Annotate to indicate application of each product submitted and compliance with requirements.
 - c. Restrained-Isolation Devices: Include ratings for horizontal, vertical, and combined loads.
- 2) Delegated-Design Submittal: For vibration isolation and seismic-restraint details indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - a. Design Calculations: Calculate static and dynamic loading due to equipment weight and operation, seismic forces required to select vibration isolators and seismic restraints.

- i. Coordinate design calculations with wind-load calculations required for equipment mounted outdoors. Comply with requirements in other electrical Sections for equipment mounted outdoors.
- b. Indicate materials and dimensions and identify hardware, including attachment and anchorage devices.
- c. Field-fabricated supports.
- d. Seismic-Restraint Details:
 - i. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
 - ii. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events.

1-04 INFORMATIONAL SUBMITTALS

- 1) Welding certificates.
- 2) Field quality-control test reports.

1-05 QUALITY ASSURANCE

- 1) Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
- 2) Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- 3) Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.
- 4) Comply with NFPA 70.

PART 2 - PRODUCTS

2-01 VIBRATION ISOLATORS

- 1) Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ace Mountings Co., Inc.
 - b. Amber/Booth Company, Inc.
 - c. California Dynamics Corporation.
 - d. Isolation Technology, Inc.
 - e. Kinetics Noise Control.
 - f. Mason Industries.
 - g. Vibration Eliminator Co., Inc.
 - h. Vibration Isolation.
 - i. Vibration Mountings & Controls, Inc.
- 2) Pads: Arrange in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.
- 3) Spring Isolators: Freestanding, laterally stable, open-spring isolators.

- a. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 - b. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 - c. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
 - d. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
 - e. Baseplates: Factory drilled for bolting to structure and bonded to 1/4-inch- (6-mm-) thick, rubber isolator pad attached to baseplate underside. Baseplates shall limit floor load to 500 psig (3447 kPa).
 - f. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.
- 4) Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic or limit-stop restraint.
- a. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to weight being removed; factory-drilled baseplate bonded to 1/4-inch- (6-mm-) thick, neoprene or rubber isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
 - b. Restraint: Seismic or limit-stop as required for equipment and authorities having jurisdiction.
 - c. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 - d. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 - e. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
 - f. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2-02 SEISMIC-RESTRAINT DEVICES

- 1) Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amber/Booth Company, Inc.
 - b. California Dynamics Corporation.
 - c. Cooper B-Line, Inc.; a division of Cooper Industries.
 - d. Hilti Inc.
 - e. Loos & Co.; Seismic Earthquake Division.
 - f. Mason Industries.
 - g. TOLCO Incorporated; a brand of NIBCO INC.
 - h. Unistrut; Tyco International, Ltd.
- 2) General Requirements for Restraint Components: Rated strengths, features, and application requirements shall be as defined in reports by an evaluation service member of ICC-ES.
- 3) Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.
- 4) Restraint Cables: ASTM A 603 galvanized-steel or ASTM A 492 stainless-steel cables with end connections made of steel assemblies with thimbles, brackets, swivels, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.
- 5) Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections of reinforcing steel angle clamped to hanger rod. Do not weld stiffeners to rods.
- 6) Bushings for Floor-Mounted Equipment Anchor: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchors and studs.

- 7) Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices.
- 8) Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.
- 9) Mechanical Anchor: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchors with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.
- 10) Adhesive Anchor: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

PART 3 - EXECUTION

3-01 APPLICATIONS

- 1) Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by an evaluation service member of ICC-ES or other agency acceptable to authorities having jurisdiction.
- 2) Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
- 3) Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3-02 SEISMIC-RESTRAINT DEVICE INSTALLATION

- 1) Equipment and Hanger Restraints:
 - a. Install restrained isolators on electrical equipment.
 - b. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch (3.2 mm).
 - c. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES or an agency acceptable to authorities having jurisdiction providing required submittals for component.
- 2) Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- 3) Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- 4) Drilled-in Anchors:
 - a. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
 - b. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.

- c. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
- d. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
- e. Set anchors to manufacturer's recommended torque, using a torque wrench.
- f. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3-03 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

- 1) Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

3-04 FIELD QUALITY CONTROL

- 1) Tests and Inspections:
 - a. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
 - b. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
 - c. Test to 90 percent of rated proof load of device.
 - d. Measure isolator restraint clearance.
 - e. Measure isolator deflection.
 - f. Verify snubber minimum clearances.
 - g. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.
- 2) Remove and replace malfunctioning units and retest as specified above.
- 3) Prepare test and inspection reports.

3-05 ADJUSTING

- 1) Adjust isolators after isolated equipment is at operating weight.
- 2) Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
- 3) Adjust active height of spring isolators.
- 4) Adjust restraints to permit free movement of equipment within normal mode of operation.

END OF SECTION 260548

SECTION 264313 – SURGE PROTECTION DEVICE (SPD)

PART 1 - GENERAL REQUIREMENTS

1-01 SCOPE OF WORK

WORK INCLUDED: Furnish all necessary labor, material, plant and equipment, including materials and equipment not specifically mentioned but necessary to complete the work in a neat, correct, and workmanlike manner, to include:

- 1) Main Electrical Service Surge Suppressor.
- 2) Computer Panelboard Surge Suppressors.

1-02 CODES AND STANDARDS

All work shall comply with the requirements of Section 260500 – Electrical Basic Materials and Methods. Each surge suppressor shall be UL 1449-Third Edition and UL 1283 listed.

1-03 WARRANTY

Each surge suppressor shall have a minimum 5-year warranty.

1-04 SUBMITTALS

Within thirty (30) days after the award of the contract, submit six (6) sets of shop drawings and equipment specifications to the Architect-Engineer for review. Shop drawings shall include specification sheets on all surge suppressors to be furnished.

PART 2 - PRODUCTS

2-01 SURGE SUPPRESSOR FOR PANELBOARDS

MANUFACTURERS: Innovative Technology, EFI, Square D, Cutler Hammer, Liebert, or APT.

120/208V, 3PH DESIGN: Suppressor shall be Innovative Technology PTE080-3Y201-D, or approved equal and shall meet the following minimum criteria: 120/208 Volt, 3 Phase, 4 Wire (plus ground) parallel configured, hard wired Multi-Circuit Surge Protection Device with true sine wave tracking, direct protection of all modes (L-N, L-L, L-G & N-G), diagnostic LED indicators (one per phase), minimum of 5 year replacement warranty, integral disconnect switch, and alarm contact. The total unit shall be UL 1449, Third Edition and UL 1283 listed. The response time of the components of the unit shall be less than or equal to 5 nanoseconds. The unit shall have a peak surge current of no less than 80KA/phase, 8 X 20 microsecond, single impulse. The unit shall have a minimum EMI/RFI attenuation of 40dB (normal mode and common mode). The manufacturer's test data for let-thru voltage for A1 ring wave, B3/C1 bi-wave, and C3 bi-wave shall be comparable to the following test data (6 inch lead length used to simulate actual installation):

	L-N	L-L	L-G	N-G
A1 Ring wave, 2000V, 67A, 180°	70V	80V	90V	90V
B3/C1 Bi-wave, 6000V, 3000A, 90°	270V	740V	270V	380V
C3 Bi-wave, 20000V, 10000A, 90°	660V	1100V	710V	840V

120/240V, 1PH DESIGN: Suppressor shall be Innovative Technology PTE080-1S101-D, or approved equal and shall meet the following minimum criteria: 120/240 Volt, 1 Phase, 3 Wire (plus ground) parallel configured, hard wired Multi-Circuit Surge Protection Device with true sine wave tracking, direct protection of all modes (L-N, L-L, L-G & N-G), diagnostic LED indicators (one per

phase), minimum of 5 year replacement warranty, integral disconnect switch, and alarm contact. The total unit shall be UL 1449, Third Edition and UL 1283 listed. The response time of the components of the unit shall be less than or equal to 5 nanoseconds. The unit shall have a peak surge current of no less than 80KA/phase, 8 X 20 microsecond, single impulse. The unit shall have a minimum EMI/RFI attenuation of 30dB (normal mode and common mode). The manufacturer's test data for let-thru voltage for A1 ring wave, B3/C1 bi-wave, and C3 bi-wave shall be comparable to the following test data (6 inch lead length used to simulate actual installation):

	L-N	L-L	L-G	N-G
A1 Ring wave, 2000V, 67A, 180°	70V	80V	90V	90V
B3/C1 Bi-wave, 6000V, 3000A, 90°	270V	740V	270V	380V
C3 Bi-wave, 20000V, 10000A, 90°	660V	1100V	710V	840V

120/240V, 3PH DESIGN: Suppressor shall be Innovative Technology PTE080-3D101-D, or approved equal and shall meet the following minimum criteria: 120/240 Volt, 3 Phase, 4 Wire (plus ground) parallel configured, hard wired Multi-Circuit Surge Protection Device with true sine wave tracking, direct protection of all modes (L-N, L-L, L-G), diagnostic LED indicators (one per phase), minimum of 5 year replacement warranty, integral disconnect switch, and alarm contact. The total unit shall be UL 1449, Third Edition and UL 1283 listed. The response time of the components of the unit shall be less than or equal to 5 nanoseconds. The unit shall have a peak surge current of no less than 80KA/phase, 8 X 20 microsecond, single impulse. The unit shall have a minimum EMI/RFI attenuation of 30dB (normal mode and common mode). The manufacturer's test data for let-thru voltage for A1 ring wave, B3/C1 bi-wave, and C3 bi-wave shall be comparable to the following test data (6 inch lead length used to simulate actual installation):

	L-N	Hi-N	L-L	L-G	Hi-G	N-G
A1 Ring wave, 2000V, 67A, 180°	250V	80V	80V	90V	90V	
B3/C1 Bi-wave, 6000V, 3000A, 90°	310V	510V	490V	700V	690V	840V
C3 Bi-wave, 20000V, 10000A, 90°	990V	1300V	1300V	1300V	1400V	1400V

LEADS: 12" maximum, #10 THHN. For optimum performance, mount surge arrestor adjacent to the panel so that leads are kept as short as possible, straight, and tightly taped.

ENCLOSURE: NEMA 4 or NEMA 12 steel enclosure, locknut and washer included.

DISCONNECT: The integral disconnect switch for the computer panel surge suppressor may be eliminated if a new 30A/3P circuit breaker is provided in the panel and the surge suppressor is wired thru this breaker.

PART 3 - EXECUTION

3-01 INSTALLATION

Furnish and install systems in accordance with the plans and specifications, all applicable codes and the manufacturer's recommendations. All wiring shall be installed in strict compliance with all the provisions of Section 260500.

3-02 CONDUIT AND WIRING

See Section 260500, Basic Materials and Methods. All wiring shall be run in raceways.

3-03 COMPLETION OF WORK

Upon completion of work, the entire system shall be completely operational and tested to conform to these specifications and drawings, and shall be reviewed by the Architect-Engineer. All defects

in workmanship and material shall be immediately corrected without additional compensation to the Contractor.

END OF SECTION 264313

SECTION 283100 - FIRE ALARM SYSTEM

PART 1 - GENERAL REQUIREMENTS

1-01 QUALIFICATIONS OF INSTALLER:

NOTE: EACH AND ALL ITEMS OF THE FIRE ALARM SYSTEM, INCLUDING WIRING, SHALL BE FURNISHED AND INSTALLED BY THE FIRE ALARM SYSTEM SUPPLIER (CONDUIT WITH PULL WIRES AND BOXES MAY BE INSTALLED BY THE ELECTRICAL CONTRACTOR). ANY WIRING OR FIRE ALARM EQUIPMENT FOUND TO BE INSTALLED BY THE ELECTRICAL CONTRACTOR SHALL BE REMOVED, DISCARDED, AND NEW FURNISHED & INSTALLED BY THE FIRE ALARM SYSTEM SUPPLIER AT NO COST TO THE OWNER OR THE ENGINEER.

Each and all items of the Fire Alarm System shall be listed as a product of a SINGLE Fire Alarm System manufacturer under the appropriate category by Underwriters' Laboratories, Inc. (UL), and shall bear the "UL" label. All control equipment is to be listed under UL category UOJZ as a single control unit. Partial listing shall NOT be acceptable. The fire alarm system shall be manufactured by an ISO 9001 certified company and meet the requirements of BS EN9001: ANSI/ASQC Q9001-1994.

1-02 GENERAL REQUIREMENTS:

Section 260500, "Basic Materials and Methods" applies to this section, with the additions and modifications specified herein.

NFPA COMPLIANCE: The complete installation is to conform to Local Code Requirements, to the applicable sections of "NFPA 72: National Fire Alarm Code", and to "NFPA 70: The National Electrical Code - 2008" with particular attention to Article 760. The entire installed system and all integrated system operations shall be within the guidelines of the 2009 International Building Code (IBC) and the 2009 International Fire Code (IFC).

ADA COMPLIANCE: The fire alarm installation shall comply with the requirements of Appendix B, "ADA Accessibility Guidelines" of the American Disabilities Act for alarm systems.

All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality. Equivalent compatible UL-listed equipment from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met.

The fire alarm cabinet for this project must be UL 864 Ninth Edition Listed.

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 judgment of the Architect-Engineer, expressed in writing prior to bidding as specified below, is equivalent to that herein named.

The drawings and specifications shall be considered as complementary, one to the other, so that materials and labor indicated, called for, or implied by either shall be furnished and installed as if required by both. Where a disagreement exists between the plans and specifications, the item or arrangements of better quality, greater quantity, or higher cost shall be included in the base bid. Any discrepancies between the drawings, specifications, and field conditions shall be resolved with the Engineer prior to commencing work. All agreements shall be verified in writing.

1-03 DESCRIPTION OF WORK:

The work includes the installation of a complete fire alarm system including associated equipment and appurtenances, complete and ready for operation. Equipment, materials, installation, workmanship, review, and testing shall be in strict accordance with the required and advisory provisions of "NFPA 72: National Fire Alarm Code". Devices and equipment for fire alarm service shall be listed by Underwriters Laboratories Inc. The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and the installation shall be in compliance with the UL listing.

WARRANTY: All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid. The Contractor shall repair or replace any deficiencies reported in the guarantee period promptly after notification, without any additional compensation from the Owner.

As part of the above one-year warranty, the Contractor shall provide the following maintenance and testing, once at the 6-month point and a second time at the twelve-month point of the warranty period. The date of the two maintenance and testing sessions shall be scheduled as part of the fire alarm system closeout documents and shall be coordinated with the Owner and the Engineer prior to acceptance of the fire alarm system. The cost of this work shall be included in the Base Bid.

- a. Examination, adjustment and cleaning of all detectors, manual fire alarm stations, control panels, power supplies, relays, waterflow switches and all accessories of the fire alarm system.
- b. Each circuit in the fire alarm system shall be tested semiannually.
- c. Each smoke detector shall be tested in accordance with the requirements of NFPA 72.

The Contractor shall provide lightning protection for the fire alarm system and fire alarm circuits per the Manufacturer's recommendation. The Contractor shall provide lightning protection for the two (2) telephone lines serving the fire alarm system.

Furnish and install wiring materials under this section as specified in Section 260500, "Basic Materials and Methods," with the additions and modifications specified herein. Furnish materials and equipment that are current products of one manufacturer regularly engaged in the production of such equipment.

The existing system was manufactured by FCI, and new equipment shall be compatible with and shall operate accurately and reliably with the existing system. Equipment and devices shall be compatible and operable in all respects with existing fire alarm system and shall not impair reliability or operational functions of existing fire alarm system.

1-04 SYSTEM DESCRIPTION:

A new intelligent reporting, microprocessor controlled fire detection system shall be installed in accordance to the project specifications and drawings. Furnish and install all items hardware, software, programming, and factory setup required to provide a complete and operable fire alarm system.

BASIC PERFORMANCE:

- a. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on NFPA Class B Signaling Line Circuits (SLC).

- b. Initiation Device Circuits (IDC) shall be wired Class B as part of an addressable device connected by the SLC Circuit.
- c. Notification Appliance Circuits (NAC) shall be wired Class B as part of an addressable device connected by the SLC Circuit.
- d. Alarm signals arriving at the FACP shall not be lost following a primary power failure (or outage) until the alarm signal is processed and recorded.
- e. NAC speaker circuits shall be arranged such that there is a minimum of one speaker circuit per floor of the building or smoke-zone whichever is greater.
- f. Audio amplifiers and tone generating equipment shall be electrically supervised for normal and abnormal conditions.
- g. NAC speaker circuits and control equipment shall be arranged such that loss of any one (1) speaker circuit will not cause the loss of any other speaker circuit in the system.
- h. Two-way telephone communication circuits shall be supervised for open and short circuit conditions.
- i. All panels and peripheral devices shall be the standard product of a single manufacturer and shall display the manufacturer's name on each component.
- j. All manual pull stations, building smoke detectors, building heat detectors, elevator smoke detectors, and extinguishing systems shall sound the building fire alarm upon activation unless specifically noted otherwise. The sprinkler tamper switch, duct smoke detectors, and door release smoke detectors shall sound a supervisory signal only upon activation, unless noted otherwise. The fire alarm control panel shall allow for on-site programming to change any device(s) signal.

BASIC SYSTEM FUNCTIONAL OPERATION: When a fire alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:

- a. The system alarm LED on the system display shall flash.
- b. A local piezo electric signal in the control panel shall sound.
- c. A backlit LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
- d. Printing and history storage equipment shall log the information associated each new fire alarm control panel condition, along with time and date of occurrence.
- e. All system output programs assigned via control-by-event interlock programming to be activated by the particular point in alarm shall be executed, and the associated system outputs (notification appliances and/or relays) shall be activated.

1-05 SUBMITTALS:

Submit Manufacturer's Data for:

Batteries and Battery Charger (If Required)
Alarm Horns/Strobe Lights
Synchronization Control Modules (SCMs)
Manual Stations
Smoke, Heat, and Duct Detectors
Monitoring Modules (MMs) and Control Modules (CMs)

SHOP DRAWINGS: Fire Alarm Shop Drawings shall comply with the requirements of 907.1.1 of the International Fire Code – 2009. Provide drawings that clearly and completely indicate the function of the control panel and devices connected thereto. Indicate termination points of devices and indicate the interconnection of modules required for proper operation of the system. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.

Equipment Supplier shall submit shop drawings indicating exact routing of raceways and number and size of conductors in raceways for the fire alarm system. The Electrical Contractor shall use the reviewed drawing for rough-in of fire alarm system raceways and outlet boxes.

CALCULATIONS: Verify that battery capacity exceeds supervisory and alarm power requirements. Provide battery calculations and voltage drop calculations with shop drawing submittal.

CERTIFICATION: Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of the installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

OPERATION AND MAINTENANCE MANUAL: Provide two (2) copies, bound securely in durable, hard cover, water-resistant binders. Include instructions for operating and maintaining system components, assemblies, and accessories; include a detailed description of the control panel and system operation under both routine and emergency conditions. Include as-built circuit diagrams complete with conductor color codes, a parts list by name, model number, and manufacturer, and a listing of smoke detector locations, with the serial number and firing voltage for each. General system descriptions included in manufacturer's catalogs or advertising media will not be acceptable in meeting the operation and maintenance manual requirement.

TRAINING: Provide training for operating personnel in the system operation. Minimum instruction period shall be four (4) hours. Evidence of completion of training shall be included with closeout documents.

1-06 SPARE PARTS:

Spare parts shall be directly interchangeable with the corresponding components of the installed system. Spare parts shall be suitably packaged and identified by nameplate, stamping, or tagging. Keys and locks for equipment shall be identical where possible. Furnish the following:

- a. See Fire Alarm System Notes on drawings for additional items

PART 2 - PRODUCTS

2-01 SYSTEM DESIGN AND OPERATION:

ACCEPTABLE MANUFACTURERS: Notifier, Simplex, Gamewell/FCI, or approved equal. Materials and equipment shall be the standard products of one manufacturer regularly engaged in the production of such equipment and shall be listed by Underwriter's Laboratories (UL).

FIELD CHARGING POWER SUPPLY (FCPS): The FCPS is a device designed for use as either a remote 24 volt power supply or used to power Notification Appliances.

- a. The FCPS shall offer up to 6.0 amps (4.0 amps continuous) of regulated 24 volt power. It shall include an integral charger designed to charge 7.0 amp hour batteries and to support 60 hour standby.
- b. The Field Charging Power Supply shall have two input triggers. The input trigger shall be a Notification Appliance Circuit (from the fire alarm control panel) or a relay. Four outputs shall be available for connection to the Notification devices.
- c. The FCPS shall include an attractive surface mount backbox.
- d. The Field Charging Power Supply shall include the ability to delay the AC fail delay per NFPA requirements.

SPECIFIC SYSTEM OPERATIONS

- a. Smoke Detector Sensitivity Adjust: A means shall be provided for adjusting the sensitivity of any or all addressable intelligent detectors in the system from the system keypad. Sensitivity range shall be within the allowed UL window.
- b. Alarm Verification: Each of the intelligent addressable smoke detectors in the system may be independently selected and enabled to be an alarm verified detector. The alarm verification delay shall be programmable from 5 to 30 seconds and each detector shall be able to be selected for verification. The FACP shall keep a count of the number of times that each detector has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.

2-03 COMPONENT DESIGN:

FURNISH & INSTALL SYSTEM SMOKE DETECTORS AT ALL FIRE ALARM CONTROL PANEL LOCATIONS, REMOTE FIRE ALARM ANNUNCIATOR LOCATIONS, AND ALL POWER SUPPLY LOCATIONS REGARDLESS OF WHETHER OR NOT THEY ARE SHOWN ON THE DRAWINGS.

ALARM SEQUENCE: The activation of any system smoke detector shall initiate an Alarm Verification operation whereby the panel will reset the activated detector and wait for a second alarm activation. If, within one (1) minute after resetting, a second alarm is reported from the same or any other smoke detector, the system shall process the alarm as described previously. If no second alarm occurs within one minute the system is to resume normal operation. The Alarm Verification is to operate only on smoke detector alarms. Other activated initiating devices shall be processed immediately. The alarm verification operation is to be selectable by device.

2-04 NOTIFICATION APPLIANCES

SYNCHRONIZED STROBE AUDIO VISUAL ALARMS: UL Listed to Standard 1971 and tested for 75 candela on-axis. Semi-flush mounted combination horn-lamp assembly suitable for use on an electrically supervised circuit. Horn shall be electronic type with a 3-pulse temporal audible signal and shall have a sound rating of 88db at 10 ft, and shall include a minimum of three settings (high/medium/low). All horns in corridors and in spaces larger than 2,000sf shall be set to "high". All other horns shall be set to "low". Lamps shall be synchronized flashing Xenon type with field selectable 15/30/75/110 candela effective intensity and a flash rate of 1 Hz, and shall be protected by a clear plastic lens. The housing shall be finished in textured red plastic with "FIRE" marked thereon in white. Strobe setting to be as indicated on the drawings.

SYNCHRONIZED STROBE VISUAL ALARMS: UL Listed to Standard 1971 and tested for 75 candela on-axis. Semi-flush mounted. Lamps shall be synchronized flashing Xenon type with field selectable 15/30/75/110 candela effective intensity and a flash rate of 1 Hz, and shall be protected by a clear plastic lens. The housing shall be finished in textured red plastic with "FIRE" marked thereon in white. Strobe setting to be as indicated on the drawings.

SYNCHRONIZATION CONTROL MODULES (SCM): Provide SCM's as required to synchronize all strobes and horns on each notification appliance circuit. Furnish, install, and wire the SCM's per the manufacturer's recommendations.

2-05 INITIATING DEVICES

There shall be no limit to the number of detectors, stations, or modules that may be activated or "in alarm" simultaneously. Detectors shown connected to magnetic door holders or other similar devices shall be furnished with 120V auxiliary SPDT contacts for release of the devices when the detectors are actuated. Detectors shall be suitable for operation on 24V DC power.

INTELLIGENT MANUAL STATIONS: Provide noncoded type with mechanical reset features. Stations shall be semiflush mounted with the base at 48 inches above the finished floor. The manual stations shall be addressable and identifiable by the master fire alarm control panel. Address assignments shall be set electronically and reside within the station in non volatile memory. Addressable pull stations shall contain electronics that communicate the station's status (alarm or normal) to the control panel over two wires that also provide power to the pull station. The stations will be manufactured from high impact red Lexan. Lettering will be raised and painted white. The station will mechanically latch upon operation and remain so until manually reset by opening with a key. Pull stations shall be dual action. The front of the station is to be hinged to a backplate assembly and must be opened with a key to reset the station. The addressable manual station shall be capable of field programming of its "address" location on an addressable signaling line circuit. Stations indicated as weatherproof shall be installed in cast metal, weatherproof housings with side-hinged access doors. Notifier NBG-12LX.

INTELLIGENT PHOTOELECTRIC TYPE DUCT SMOKE DETECTORS: UL 268A. Detectors in ducts shall comply with UL requirements for sensing of products of combustion in air handling/duct systems for each air handler. Provide power on LED and relay for AHU shut down. The relay must be capable of being logically controlled independent of the detector head. To minimize nuisance alarms, detectors shall have an insect screen and be designed to ignore invisible particles or smoke densities that are below the factory set point. No radioactive material shall be used. The 24VDC intelligent analog duct detector shall communicate actual smoke chamber values to the system control. For maintenance purposes, it shall be possible to clean the duct housing sampling tubes by accessing them through the duct housing front cover. Notifier FSD-751RPL duct detector with RTS451KEY key-activated remote test station.

Duct Detectors shall be furnished and installed by the Fire Alarm System Contractor. Wiring for the Fire Alarm System shall be furnished and installed by the Fire Alarm System Contractor. Keyed Test Station and Alarm Light to be furnished and installed by the Fire Alarm System Contractor. Wiring for HVAC control/shutdown shall be furnished and installed by the Mechanical Contractor. Coordinate in field prior to rough-in as required. Refer to manufacturer's installation instructions prior to installing duct smoke detectors and coordinate the location of each duct detector with the Mechanical Contractor prior to rough-in to insure compliance with the manufacturer's requirements. See fire alarm notes for location and testing of duct mounted smoke detectors.

INTELLIGENT HEAT DETECTORS: UL 521. Detectors shall be semi-flush mounted intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. No detector shall be located closer than 12" to any part of any light fixture. Notifier FST-851 with B710LP base (no relay) or B224RB base (intelligent relay).

INTELLIGENT MONITORING MODULES AND CONTROL MODULES: Monitoring Modules (MMs) shall be used for monitoring of waterflow, valve tamper, Halon Control Panels, and non-addressable detectors. Notifier MMM-100. Control Modules (CMs) shall be used for control of evacuation indicating appliances and AHU systems. Notifier NC-100. Modules shall be capable of mounting in a standard electric outlet box and shall include cover plates to allow surface or flush mounting. CMs shall receive their 24VDC power from a separate two wire pair running from an appropriate power supply. Each Module shall be supervised and uniquely identified by the control panel. Device identification shall be transmitted to the control panel for processing according to the program instructions. Should a Module become non-operational, tampered with, or removed, a discrete trouble signal, unique to the device, shall be transmitted to, and annunciated at, the control panel. Modules shall be capable of being programmed for "address" location on the addressable device signaling line circuit, and shall be compatible with addressable manual stations and addressable detectors on the same addressable circuits.

2-06 WIRE

WIRING: Furnish and install in accordance with NFPA 70 and NFPA 72. Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Conductors for 120-volt circuits shall be No. 12 AWG minimum. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for Initiating Device Circuits and Signaling Line Circuits, and 14 AWG (1.63 mm) for Notification Appliance Circuits. Identify conductors within each enclosure where a tap, splice, or termination is made. Identify conductors by plastic-coated, self-sticking, printed markers or by heat-shrink type sleeves. Wire the alarm initiating and notification signal devices so that removal will cause the system trouble device to sound. Pigtail or "T" tap connections to evacuation alarm bells, horns, and fire warning lights are not acceptable. Each conductor used for the same specific function shall be distinctively color coded. Each circuit color code wire shall remain uniform throughout circuit.

- a. All fire alarm system wiring shall be new (verify all fire alarm system wiring requirements with the equipment manufacturer prior to starting work). Conductors shall be copper.
- b. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
- c. Wiring used for the multiplex communication circuit (SLC) shall be twisted and unshielded and support a minimum wiring distance of 12,500 feet. The design of the system shall permit use of IDC and NAC wiring in the same conduit with the SLC communication circuit.
- d. All field wiring shall be electrically supervised for open circuit and ground fault.
- e. The fire alarm control panel shall be capable of t-tapping Class B Signaling Line Circuits (SLCs). Systems that do not allow or have restrictions in, for example, the amount of t-taps, length of t-taps etc., are not acceptable.

Wiring types will be approved by the equipment manufacturer. The system must allow up to 2,500 feet wire length to the furthest addressable device. Class A communications will be provided where shown on the drawings. Wire and conduit will be routed to maintain sufficient distance between the forward and return loop as called for by the authority having jurisdiction. Class B communications will be provided where shown on the drawings.

Use solid conductors with 600V Type THHN-THWN-MTW insulation for systems operating at 120V, and 300V Type TF insulation for systems operating at low voltage (24V or less). Stranded wire may be used if Sta-Con connectors are used at all screw terminals.

2-07 RACEWAYS

Galvanized rigid conduit (GRC) or Intermediate grade metallic conduit (IMC) with screwed fittings, or Electrical metallic tubing (EMT) with compression type fittings or all-steel set screw fittings. See Section 260500, Basic Materials and Methods.

All circuits shall be in metal conduit, unless noted otherwise. All raceways shall be run concealed in walls or ceilings in EMT, GRC, or IMC, unless noted otherwise. Where surface raceway is required and is approved in writing by the Architect and the Owner, use Wiremold ivory surface metal raceway with red surface metal boxes compatible with fire alarm devices, except that EMT with steel boxes may be used in storage rooms, etc. requiring surface raceway. No high voltage wiring will be permitted in the same raceway or electrical box with any wiring of the fire alarm system except where there is a direct interface such as programmable relay controlling an external device. Where this occurs, the box must be clearly marked to indicate the presence of high voltage.

PART 3 - INSTALLATION

3-01 WORKMANSHIP

All work shall be installed in a neat and orderly manner. Devices, cabinets, covers, fixtures, exposed raceways, etc., shall be aligned parallel or perpendicular to the building walls, ceiling and floor. Wiring in panelboards and cabinets shall be neatly looped and laced, and not wadded. The Owner reserves the right to require repair or replacement of defective workmanship and material without additional compensation to the Contractor.

3-02 SUPPORTS

Conduits, boxes, cabinets, enclosures, etc., shall be securely supported by structural members or structural walls at intervals required by the NEC or as recommended by the manufacturer. Plaster, gypsum board, acoustical tile, and other ceiling and wall finish material shall not be used for support.

3-03 MANUFACTURER'S REPRESENTATIVE

The services of a qualified manufacturer's representative or technician, experienced in the installation, operation, testing, and servicing of the type of system being installed, shall supervise the installation, connecting, software documentation, testing, and adjusting of the system, and train the Owner's personnel in operation of the system. Certified test reports of the final satisfactory test shall be submitted to the Architect-Engineer.

3-04 CONDUIT AND WIRING

See Section 260500, Basic Materials and Methods. All wiring shall be run in EMT, GRC, or IMC conduit. All junction box covers shall be spray painted red and labeled "Fire Alarm". Conductors shall be color coded as follows:

Red/Black	Indicating Circuits (Horns/lights)
Blue/Yellow	Manual Initiating Circuits (Different zones shall be numbered)
Brown/Orange	Automatic Initiating Circuits (Different zones shall be numbered)
White/Green	Do Not Use

3-05 INITIATING AND INDICATING DEVICES

Initiating and indicating devices shall be SECURELY installed as indicated on the drawings and connected in accordance with the applicable wiring diagrams. The contractor shall clean all dirt and debris from the inside and outside of the fire alarm equipment after completion of the installation. The smoke detection devices shall be covered with plastic bags or hard covers in accordance with the manufacturer's recommendations after installation to maintain cleanliness. The bags/covers shall be red for quick visual identification for removal at time of occupancy.

3-06 TESTS

Upon completion of work, the entire system shall be completely operational and tested to conform with these specifications and drawings, and reviewed by the Architect-Engineer. Test shall be performed in accordance with the fire alarm system manufacturer's instructions and per NFPA 72 requirements. All defects in workmanship and material shall be immediately corrected without additional compensation to the Contractor.

SMOKE DETECTOR TESTS: Prior to formal review and tests, clean and perform operational test on each smoke detector. Clean the smoke detectors in accordance with the manufacturers recommended procedures.

DUCT MOUNTED SMOKE DETECTOR TESTS: Prior to formal review and tests, clean and perform operational test on each smoke detector. Clean the smoke detectors in accordance with the manufacturers recommended procedures. Provide documentation of duct detector testing per NFPA 72 Table 14.4.2.2-14(g)(6). Air duct detectors shall be tested or inspected to ensure that the device will sample the airstream. The test shall be made in accordance with the manufacturer's published instructions.

FIELD REVIEW AND TEST: Before final acceptance of the work, test each system to demonstrate compliance with the contract requirement. Each system shall be subjected to complete functional and operational tests including tests in place of each heat and smoke detector (smoke testing aerosols containing oil are NOT acceptable). When tests have been completed and corrections made, submit a signed and dated certificate with a request for formal review and tests.

FORMAL REVIEW AND TEST: The Engineer will witness formal tests after receipt of written certification that preliminary tests have been completed and that the system is ready for final review. The system manufacturer's technical representative shall be present for the final review and test. Preliminary tests shall be repeated, and functional and operational tests conducted, as requested by the Engineer. Correct defects and conduct additional tests to demonstrate that the system conforms to contract specifications.

3-07 INSTRUCTION

Instruction shall be provided as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.

The contractor and/or the systems manufacturer's representatives shall provide a typewritten "Sequence of Operation."

3-08 CLEAN-UP

Upon completion of all installations and prior to final acceptance by the Owner, all debris shall be removed from the site. Cabinets, enclosures, cover plates, etc., shall be cleaned and paint touched up.

END OF SECTION 283100

