Georgia State University

DESIGN BID BUILD CONSTRUCTION CONTRACT & PROJECT MANUAL

BETWEEN CONTRACTOR AND OWNER

Urban Life – School of Public Health 2nd Floor Renovations

Gsu Project No. 010-124-18

Bid No. P (TBD)
December 31, 2018

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Scope of Work

The project is anticipated to be awarded under a single prime contract for the Renovation of a portion of the 2nd Floor of the Urban Life Building for the School of Public Health. The project consists of an approximately 9,000 square foot renovation to include reconfiguration of existing classroom space as well as finish upgrades in existing office areas. The building must remain fully operational during the course of the construction.

SAMPLE CONTRACT ONLY

CONSTRUCTION CONTRACT
BETWEEN CONTRACTOR AND OWNER

THIS CONSTRUCTION CONTRACT ("Contract") made this **INSERT DATE** day of **INSERT MONTH** , **20__** (the "Effective Date"), by and between **INSERT CONTRACTOR NAME** , (hereinafter the "Contractor"), whose address is Insert Contractor Address , (Contractor's Address) and the BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA BY AND ON BEHALF OF **GEORGIA STATE UNIVERSITY** (hereinafter the "Owner" or "Using Agency" or "Institution).

(a) Contractor's FEIN or Tax Identification Number: _____

(b) Contractor's Georgia License Type and Number: _____

(c) Contractor's Federal Employment Verification Certification:
The Contractor is registered with, authorized to use, is using and will continue to use, the federal work authorization program throughout the term of the contract, and holds the following authorization:

User Identification Number: _____

Date of Authorization: _____

WITNESSETH, that the Contractor and the Owner, for the consideration set forth herein, the adequacy and sufficiency of which is hereby acknowledged by each party, agree as follows:

Project No. Project Number

Project Name and Description: PROJECT DESCRIPTION (hereinafter the "Project.")

1. Existing Documents. The Contractor has reviewed and taken into consideration the Bidding Documents in preparing his bid.

2. The Contract Sum: The Owner shall pay the Contractor for the performance of the contract, subject to additions and deductions provided by approved change orders, in current funds, the Contract Sum as follows:

INSERT CONTRACT SUM Dollars ($_____)

3. The Material Completion and Occupancy Date shall be achieved within **Insert Number of Days** consecutive calendar days beginning the date specified in the Proceed Order.

4. **The agreed daily amount for Liquidated Damages is:** **$** 0.00 per day.

5. **The agreed daily amount for Time Dependent Overhead Costs is:** $_____ per day. To be determined at contract preparation.)

6. Notice. All notices in accordance with Section 1.1.5 shall be given to the following addresses:

CONTRACTOR:

Contractor Name
Physical Address, NO P.O. Boxes
City, State Zip
Attention: Contractor POC for Project
Phone Number: Contractor Phone
Facsimile Number: Contractor Fax
Email: Contractor Email address

SAMPLE CONTRACT ONLY

OWNER: Board of Regents of the University System of Georgia
by and on Behalf of **Georgia State University**

OWNER'S REPRESENTATIVE: Georgia State University
Facilities Management – Design and Construction Services
34 Broad Street, Suite 1200
Atlanta, Georgia 30334
Attention: Mr. Ramesh Vakamudi
Phone Number: 404-413-0800

DESIGN PROFESSIONAL: DP Firm Name
DP Address Line 1
DP Address Line 2
Attention: DP POC for Project
Phone Number: DP Phone
Facsimile Number: DP Fax

7. Scope Of The Work: The Contractor shall furnish all the materials, perform all of the Work, and do all things required by the Contract Documents and as shown in Exhibit A.

8. Schedule and Completion: The Pre-commencement Phase Services to be performed under this Contract shall commence upon the Effective Date of the Contract and be completed within 60 days thereafter. Activities on the Site shall commence on the date specified in the Proceed Order and shall be materially complete in accordance with established Milestones, and not later than the Material Completion and Occupancy Date.

9. Periodic Progress Payments: The Owner shall make progress payments, less retainage, as set forth in Section 4 of the General Conditions.

10. Payment for Material Completion: The Contractor may request payment of the remaining contract balance, including retainage, less amounts credited the Owner or incurred as liquidated damages, and less amounts withheld for the Punchlist by reason of Minor Items or Permitted Incomplete Work (See Paragraph 6.5.3.2). Payment for Material Completion shall be made by a check payable jointly to the Contractor and Surety and shall be mailed to the Surety.

11. Final Payment: Final Payment shall be made within ten days of receipt of the final payment application as set forth in Section 6, Part 2 of the General Conditions, provided that all other requirements of the Contract shall have been met in full.

12. The Contract Documents: **This Contract, together with the Bidding Documents and the Bid, shall constitute the Contract Documents for the Project.**

13. Bonds: The Contractor shall furnish both a performance bond and a payment bond and shall pay the premiums thereon as a Cost of the Work. The Performance Bond shall guarantee the full performance of the Contract.

14. Full Performance: The Owner and the Contractor hereby agree to the full performance of the Contract Documents.

15. Applicable Law: This Contract and all rights, privileges and responsibilities shall be interpreted and construed according to the laws of the State of Georgia.

16. No Conflict Of Interest: The Contractor covenants that it presently has no interest and shall not acquire any interest, direct or indirect, that would conflict in any manner or degree with the performance required under this Contract. The Contractor further covenants that, in the performance of this Contract, it shall neither contract with nor employ any person having any such interest.

17. Transactions With State Officials, Ethics: The parties hereto certify that the provisions of law contained in the Act prohibiting full-time appointive officials and employees of the State from engaging in certain transactions affecting the State as defined in O.C.G.A. §§45-10-20–26 and the Governor's Executive Orders governing ethics, have not and will not be violated in any respect in regard to this contract and further certifies that registration and all disclosures required thereby have been complied with.

SAMPLE CONTRACT ONLY

18. No Assignment: This Contract and the proceeds of this Contract may not be assigned or sublet as a whole, nor may the performance thereunder be assigned, without the prior written consent of the Owner.

19. No Waiver: The failure of the Owner at any time to require performance by the Contractor of any provision hereof, shall in no way affect the right of the Owner thereafter to enforce any provision or any part of the Contract, nor shall the failure of the Owner to enforce any breach of any provision hereof to be taken or held to be a waiver of such provision, or as a waiver, modification or rescission of the Contract itself.

20. Full Agreement. The Contract Documents supersede all prior negotiations, discussion, statements, and agreements between Owner and Contractor and constitute the full, complete, and entire agreement between Owner and Contractor. There can be no changes to this Contract by oral means, nor by course of conduct of the parties, nor by custom of the trade. No changes to this Contract will be binding on either party hereto unless such change is properly authorized, in writing, in accordance with Section 3, Part 2 of the General Conditions.

IN WITNESS WHEREOF the parties hereto have executed this Contract the day and year first written above.

INSERT CONTRACTOR NAME
(Contractor)

ATTEST:

_____ (L.S.) By: _____ (L.S.)

_____, Secretary _____, President
(Print Name) (Print Name)
(SEAL Over Signature)

OWNER: BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA by and on behalf of GEORGIA STATE UNIVERSITY

BY: _____ (L.S.)
JERRY J. RACKLIFFE, SENIOR VICE PRESIDENT

WITNESS: _____

SAMPLE

BID REQUIREMENTS For Projects over $100,000

INVITATION TO BID

The Owner will receive sealed bids from Contractors in Room **901, Purchasing Department, 1 Park Place South,** Atlanta, Georgia. Bids must be physically on the table in the Bid Room by **Time a.m./p.m.** at the time legally prevailing in Atlanta, Georgia on **Date** for the construction of **Project # xxx-xxx-xx, Name of Project,** Georgia State University, Atlanta, Georgia At the time and place noted above, the bids will be publicly opened and announced.

Bidding Documents are posted on the web site of the Georgia Procurement Registry, at the following URL: http://ssl.doas.state.ga.us/PRSapp/PR_index.jsp. Acquisition of Bidding Documents from unauthorized sources places the bidder at risk of receiving incomplete or inaccurate information upon which to base a bid.

There will be a MANDATORY Pre-Bid & Site Tour held on **date at time a.m./p.m.** at the GSU Facilities Office located at the Commerce Club Building, 34 Broad Street 12th Floor, Room 1226, Atlanta, GA 30303. Any firm that plans to bid on this project must attend both the pre-bid and site tour. Those attending will be required to sign in prior to the start of the pre-bid conference and sign out at the conclusion of the site visit. While the pre-bid and site tour are mandatory for those bidding, others may attend if they so desire.

Contract, if awarded, will be on a lump sum basis. No bid may be withdrawn for a period of thirty-five days after time has been called on the date of opening except in accordance with the provisions of Georgia law. Bids must be accompanied by a Bid Bond made payable to the Owner in an amount equal to not less than five percent of the Bid. Both a performance bond and a payment bond will be required, each in an amount equal to 100 percent of the Contract Sum prior to execution of contract.

The Owner reserves the rights in its sole and complete discretion to reject all bids and any bid that is not responsive or that is over the budget. The Owner anticipates that the contract will be awarded to the responsive and responsible bidder who provides the lowest bid within the budget. In judging whether the bidder is responsible, the Owner will consider, but is not limited to, the following:

- Whether the bidder or its principals are currently ineligible, debarred, suspended, or otherwise excluded from bidding or contracting by any state or federal agency, department, or authority;
- Whether the bidder or its principals have been terminated for cause or are currently in default on a public works contract;
- Whether the bidder can demonstrate sufficient cash flow to undertake the project as evidenced by a Current Ratio of 1.0 or higher;
- Whether the bidder can demonstrate a commitment to safety with regard to Workers' Compensation by having an Experience Modification Rate (EMR) over the past three years not having exceeded an average of 1.2; and
- Whether the bidder's past work provides evidence of an ability to successfully complete public works projects within the established time, quality, or cost, or to comply with the bidder's contract obligations.

In the event all responsive and responsible bids are in excess of the budget, the Owner, in its sole and absolute discretion and in addition to rejecting all bids, reserves the right either to supplement the budget or to negotiate with the lowest responsive and responsible bidder (after all deductive alternates are taken) but only for the purpose of making changes to the project that will result in a cost to the Owner that is within the budget, as it may be supplemented.

GEORGIA STATE UNIVERSITY PURCHASING DEPARTMENT

BY: Rodney O. Holden, GCPA
Procurement Specialist II
Purchasing Department
Office: 404-413-3158
Fax: 404-413-3164

BID REQUIREMENTS

INSTRUCTIONS TO BIDDERS

1. **Basis of Contract.** Contract, if awarded, will be on a lump sum basis and will be substantially in accordance with the Contract shown on pages Contract – 1 to Contract – 4.

2. **Examination of Site.** In undertaking the work under this Contract, the Contractor acknowledges that he has visited the Project Site and has taken into consideration all observed conditions that might affect his work.

3. **Surety and Insurance Companies.** The Contract provides that the surety and insurance companies must be acceptable to the Owner. Only those sureties listed in the Department of Treasury's Listing of Approved Sureties (Department Circular 570) are acceptable to the Owner. At the time of issuance, all insurance and bonds must be issued by a company licensed by the Georgia Insurance Commissioner to transact the business of insurance in the State of Georgia for the applicable line of insurance. Such company shall be an insurer (or, for qualified self insurers or group self insureds, a specific excess insurer providing statutory limits) with an A.M. Best Financial Strength Rating of "A-" or better and with an A.M. Best Financial Size Category of Class V or larger.

4. **Bidding Documents.** The Bidding Documents comprise the Construction Documents, the Invitation to Bid, the Instructions to Bidders, the Bid Form, Statement of Bidder's Qualification and all Addenda, upon which the bidder submits a bid.

5. **Addenda.** All Addenda issued prior to bid date adjust, modify, or change the drawings and specifications as set forth in the Addenda. No Addenda will be issued within five days of the date set for opening bids without an extension of the bid date. All such Addenda are part of the contract.

6. **Interpretations.** No oral interpretation will be made to bidders as to the meaning of the drawings and specifications. Requests for interpretation of drawings and specifications must be made in writing to the Design Professional not later than six days prior to the date set for receipt of the bids. Failure on the part of the successful bidder to request clarification shall not relieve him as Contractor of the obligation to execute such work in accordance with a later interpretation by the Design Professional. All interpretations made to bidders will be issued in the form of Addenda to the plans and specifications and will be sent to all plan holders of record. Acknowledgement of receipt of such Addenda shall be listed in the Bid Form by the Contractor.

7. **Alternates.** Unless otherwise stipulated, all alternate bids are deductive. It is in the best interest of the public, and the intent of the Owner is, that the entire Project be constructed within the funds allocated in the Project budget. The acceptance of any deductive alternate will be utilized as a last resort to accomplish the Project without requiring a redesign and rebidding of the Project. Any alternate, or alternates, if taken, will be taken in numerical sequence to the extent necessary.

8. **Sales Tax.** Unless otherwise provided for in the Contract Documents, the Contractor shall include in his bid all sales taxes, consumer taxes, use taxes, and all other applicable taxes that are legally in effect at the time bids are received.

9. **Trade Names, Specifications.**

(a) *No Restriction of Competition.* When reference is made in the Contract Documents to trade names, brand names, or to the names of manufacturers, such references are made solely to indicate that products of that description may be furnished and are not intended to restrict competitive bidding. If it is desired to use products of trade or brand names or of manufacturers' names that are different from those mentioned in the Bidding Documents, application for the approval of the use of such products must reach the hands of the Design Professional at least ten days prior to the date set for the opening of bids (*see* 9(b) below). This provision applies only to the party making a submittal prior to bid. If approved by Design Professional, the Design Professional will issue an addendum to all bidders. This provision does not prevent the Owner from initiating the addition of trade names, brand names, or names of manufacturers by addendum prior to bid.

(b) *Request for Approval of Substitute Product.* All requests for approval of substitution of a product that is not listed in the Bidding Documents must be made to the Design Professional in writing. For the Design Professional to prepare an addendum properly, an application for approval of a substitute product must be accompanied by a copy of the published recommendations of the manufacturer for the installation of the product together with a complete schedule of changes in the drawings and specifications, if any, that must be made in other work in order to permit the

use and installation of the proposed product in accordance with the recommendations of the manufacturer of the product. The application to the Design Professional for approval of a proposed substitute product must be accompanied by a schedule setting forth in which respects the materials or equipment submitted for consideration differ from the materials or equipment designated in the Bidding Documents.

(c) *Burden of Proof.* The burden of proving acceptability of a proposed product rests on the party making the submission. Therefore, the application for approval must be accompanied by technical data that the party requesting approval desires to submit in support of its application. The Design Professional will consider reports from reputable independent testing laboratories, verified experience records showing the reputation of the proposed product with previous users, evidence of reputation of the manufacturer for prompt delivery, evidence of reputation of the manufacturer for efficiency in servicing its products, or any other written information that is helpful in the circumstances. The degree of proof required for approval of a proposed product as acceptable for use in place of a named product or named products is that amount of proof necessary to convince a reasonable person beyond all doubt. To be approved, a proposed product must also meet or exceed all express requirements of the Contract Documents.

(d) *Issuance of Addenda.* If the Design Professional approves the submittal, an addendum will be issued to all prospective bidders indicating the approval of the additional product(s). Issuance of an addendum is a representation to all bidders that the Design Professional in the exercise of his professional discretion established that the product submitted for approval is acceptable and meets or exceeds all express requirements. If a submittal is initially rejected by the Design Professional, but determined to be acceptable to Design Professional after a conference with the Owner, an addendum covering the said submittal will be issued prior to the opening of bids. The successful bidder may furnish no products of any trade names, brand names, or manufacturers' names except those designated in the Contract Documents unless approvals have been published by addendum in accordance with the above procedure. Oral approvals of products are not valid.

(e) *Conference with the Owner*. Any party who alleges that rejection of a submittal is the result of bias, prejudice, caprice, or error on the part of the Design Professional may request a conference with a representative of the Owner, provided: that the request for said conference, submitted in writing, shall have reached the Owner at least six days prior to the date set for the opening of bids, time being of the essence.

10. **Employment of Georgia Citizens and Use of Georgia Products.** The work provided for in this Contract is to be performed in Georgia. It is the desire of the Owner that materials and equipment manufactured or produced in Georgia shall be used in the work and that Georgia citizens shall be employed in the work at wages consistent with those being paid in the general area in which the work is to be performed. This desire on the part of the Owner is not intended to restrict or limit competitive bidding or to increase the cost of the work; nor shall the fulfillment of this desire be asserted by the Contractor as an excuse for any noncompliance or omission to fulfill any obligation under the contract.

11. **Trading with the State Statutes, Ethics.** By submitting a bid, the bidder certifies that the provisions of law contained in O.C.G.A. Sections 45-10-20 to 45-10-71, which prohibit officials and employees of the state from engaging in certain transactions with the state and state agencies, and the Governor's Executive Orders governing ethics, have not and will not be violated in any respect in regard to this contract and further certifies that registration and all disclosures required thereby have been complied with.

12. **Georgia Security and Immigration Compliance Act Requirements.** No bid will be considered unless the Contractor certifies its compliance with the Immigration reform and Control Act of 1986 (IRCA), D.L. 99-603 and the Georgia Security Immigration Compliance Act OCGA 13-10-90 *et seq.* Contractor shall certify that Contractor has registered at https://e-verify.uscis.gov/enroll/ o verify information of all newly hired employess in order to comply with the Immigration reform and Control Act of 1986 (IRCA), D.L. 99-603 and the Georgia Security Immigration Compliance Act. The Contractor shall execute the Georgia Security and Immigration Compliance Act Affidavit, as found in Section 7 of the Construction Contract. Contractor also agrees that it will execute any affidavits required by the rules and regulations issued by the Georgia Department of Labor set forth at Rule 300-10-1-01 *et seq*. If the Contractor is the successful bidder, contractor warrants that it will include a similar provision in all written agreements with any subcontractors engaged to perform services under the Contract.

13. **Owner's Policy Statement.** The policy of the Owner is that minority business enterprises shall have the maximum opportunity to participate in the Owner's purchasing process. The Owner encourages all minority business enterprises to compete for, win, and receive contracts for goods, services, and construction. In addition, Georgia law provides a state income tax credit available to any business that subcontracts with a minority-owned business. [*See* O.C.G.A. §48-7-38 and O.C.G.A. §50-5-130. *See also* Executive Order of the Governor No. A-11-0002-1992.] For more information, please contact the Board of Regents' Office of Business Development by e-mail at BusinessDevelopment@usg.edu. Any

questions regarding statements contained hereunder should be directed to {Name, Address, and Telephone Number of Designee, as described in the box below}.

NOTE TO DESIGN PROFESSIONAL

By Executive Order of the Governor, all state agencies, authorities, commissions, and institutions shall have appointed a designee to act as a liaison between their organization and minority vendors to provide one on one assistance and to ensure that bid information is

14. **Bids.**

(a) *Bid Opening.* Bids will be opened and announced as stated in the Invitation to Bid.

(b) *Bid Submission.* All bids must be submitted on the Bid Form as attached hereto and must be signed, notarized, and sealed by a notary public. The statement of Bidder's Qualifications should be completed, signed and notarized and submitted with the bid package. All blanks for information entry in bid forms submitted to Owner should be filled. Blanks left unfilled constitute irregularities in the bid and place the bidder at risk of having the bid rejected. Numbers shall be written in English words and in Arabic numerals. **The inclusion of any condition, alternate, qualification, limitation, or provision not called for shall render the bid nonresponsive and shall be sufficient cause for rejection of a bid.**

(c) *Bid Security.* Bids must be accompanied by a Bid Bond made payable to the Owner in an amount not less than five percent of the Bid. Bid Bonds should be furnished on forms accepted as standard by the insurance industry, but shall be substantially in accordance with the Bid Security Form attached hereto.

(d) *Delivery of Bids.* Bids are to be addressed to the Owner, at the address and room number shown in the Invitation to Bid. Bids must be enclosed in an opaque, sealed envelope; marked with the Bid Date, Bid Time, Bid Number, Name of Project; and identified with the words "Bid for Construction." Bids must be placed in the hands of the Owner at the specified location by not later than the hour and date named in the Invitation to Bid. After that time, no bids may be received. It is the sole responsibility of the bidder to ensure the delivery of the bids to the required address.

(e) Alternates. A bid must be submitted for all alternates. Failure to so may render the bid nonresponsive and be sufficient cause for rejection of a bid.

(f) *Withdrawal of Bids.* Bids may be withdrawn by bidders prior to the time set for official opening. After time has been called, no bid may be withdrawn for a period of thirty-five days after the time and date of opening except as provided in O.C.G.A Section 13-10-22 (appreciable error in calculation of bid). Negligence or error on the part of any bidder in preparing his bid confers no right of withdrawal or modification of his bid after time has been called except as provided by Georgia law.

15. **Contract Award.** Award shall be made on a lump sum basis to the lowest responsive and responsible bidder. The lowest bid will be the bid whose price, after incorporating all accepted alternates, is the lowest responsive bid that was received from a responsible bidder. No bid may be withdrawn for a period of thirty-five days after time has been called on the date of opening except in accordance with the provisions of law.

16. **Owner's Rights Concerning Award.** The Owner reserves the right in its sole and complete discretion to reject all bids and any bid that is not responsive or that is over the budget, as amended. In judging whether the bidder is responsible, the Owner will consider, but is not limited to consideration of, the following:

(a) Whether the bidder or its principals are currently ineligible, debarred, suspended, or otherwise excluded from bidding or contracting by any state or federal agency, department, or authority;

(b) Whether the bidder or its principals have been terminated for cause or are currently in default on a public works contract;

(c) Whether the bidder can demonstrate sufficient cash flow to undertake the project as evidenced by a Current Ratio of 1.0 or higher;

(d) Whether the bidder can demonstrate a commitment to safety with regard to Workers' Compensation by having an Experience Modification Rate (EMR) over the past three years not having exceeded an average of 1.2;

(d) Whether the bidder's past work provides evidence of an ability to successfully complete public works projects within the established time, quality, or cost, or to comply with the bidder's contract obligations; and

(e) Whether the bidder has been in business under current company name for not less than five (5) years.

17. **Owner's Right to Negotiate with the Lowest Bidder.** In the event *all* responsive and responsible bids are in excess of the budget, the Owner, in its sole and absolute discretion and in addition to the rights set forth above, reserves the right either to (i) supplement the budget with additional funds to permit award to the lowest responsive and responsible bid, or (ii) to negotiate with the lowest responsive and responsible bidder (after taking all deductive alternates) only for the purpose of making changes to the Project that will result in a cost to the Owner that is within the budget, as it may be amended.

18. **Contract Forms.** The contract forms, including the payment and performance bonds, shall be as set forth in the General Conditions, Section 7 – Forms.

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]

BID REQUIREMENTS

BID PROPOSAL FORM

To: The Board of Regents of the University System of Georgia by and on behalf of Georgia State University, Owner

Re: Project Number and Name: #xxx-xxx-xx, PROJECT NAME

Bid Date:_____

THE BID:

Bid. Having carefully examined the Specifications entitled PROJECT NO. {DESIGN PROFESSIONAL insert Project name and number}, and the Bidding Documents and Addendum No.(s) _____, as well as the Site and conditions affecting the Work, bidder hereby proposes to furnish all services, labor, materials, and equipment called for by them for the entire Work, in accordance with the aforesaid documents, for the sum of:

_____ Dollars ($ _____)

which sum is hereinafter called the Bid. The Bid shall be the amount of the Contract Sum executed between the Owner and the Contractor unless Alternates are accepted.

Alternates. We further propose that, should any of the following alternates be accepted and be incorporated in the Contract, the Bid will be altered in each case as follows:

No Alternates???

Errors or Revisions. Prior to the bid opening date and hour, errors may be stricken or revisions may be made and corrections entered on this proposal form. All such annotations shall be binding on the bidder. NO REVISIONS SHALL BE PERMITTED ON THE BID ENVELOPE.

No Withdrawal. For and in consideration of the sum of $10.00, the receipt of which is hereby acknowledged, bidder and Owner agree that this bid may not be revoked or withdrawn after the time set for the opening of bids, except as provided in Georgia law, but is an irrevocable offer that shall remain open for acceptance for a period of thirty-five days following the time set for the opening of bids.

Execution of the Contract. If bidder is notified in writing by statutory mail of the acceptance of this bid within thirty-five days after time set for the opening of bids, bidder agrees to execute within ten days the Contract for the Work for the above stated Bid, as adjusted by the accepted Alternates, and at the same time to furnish and deliver to the Owner a Performance Bond and a Payment Bond on forms shown in Section 7 of the General Conditions of the Contract, both in an amount of equal to 100 percent of the Contract Sum.

Commencement and Completion of Work. Upon the Effective Date of the Contract, bidder agrees to commence all Preconstruction Activities. Upon issuance of a Proceed Order, bidder agrees to commence physical activities on the Site with adequate forces and equipment and to **provide Material Completion all work no later than xx days** after the Notice to Proceed order is issued.

Bid Bond. Enclosed herewith is a Bid Bond *(NO OTHER FORM ACCEPTABLE)* in the amount of _____ Dollars ($ _____) (being not less than five percent of the Bid). Bidder agrees that the above stated amount is the proper measure of liquidated damages that the Owner will sustain by bidder's failure to execute the Contract or to furnish the Performance and Payment Bonds should bidder's bid be accepted.

Obligation of Bid Bond. If this bid is accepted within thirty-five days after the date set for the opening of bids and bidder fails to execute the Contract within ten days after Notice of Successful Bid, or if bidder fails to furnish both Performance and Payment Bonds, the obligation of the Bid Bond will remain in full force and effect and the money payable thereon shall be paid into the funds of the Owner as liquidated damages for such failure; otherwise, the obligations of the Bid Bond will be null and void.

Bidder Certification

Certification under Oath. Under oath I certify that I am a principal or other representative of the bidder, and that I am authorized by it to execute the foregoing bid on its behalf; and further, that I am a principal person of the bidder with management responsibility for the construction for the bidder, and as such I am personally knowledgeable of all its pertinent matters. I further certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, or person submitting a bid for the same services, materials, labor, supplies, or equipment and is in all respects fair and without collusion or fraud. Bidder and its principals understand that collusive bidding is a violation of state and federal law and can result in fines, prison sentences, and civil damage awards. Bidder agrees to abide by all conditions of this bid.

BY: _____
Authorized *Signature* *(BLUE INK PLEASE)*

_____
Printed Name Title

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

_____
Notary Public

My commission expires: _____

(SEAL)

NOTE: THE NOTARY SEAL MUST BE APPLIED UNDER GEORGIA LAW, WHETHER OR NOT THE LAW OF THE STATE WHERE EXECUTED PERMITS OTHERWISE.

STATEMENT OF BIDDER'S QUALIFICATIONS:
(To be subscribed and sworn to before a notary public.)

The bidder submits the following statement of bidder's qualifications for consideration by the Owner.

Bidder's Name: _____
LEGAL NAME OF BUSINESS

Bidder's Address: _____
LEGAL BUSINESS ADDRESS (P.O. BOX IS INSUFFICIENT)

_____
CITY STATE ZIP

_____
MAILING ADDRESS IF DIFFERENT FROM ABOVE

Telephone Number: _____ _____
AREA CODE NUMBER

The full names of persons and firms interested in the foregoing bid as principals are as follows:

(1)_____
Circle One: President Partner Owner Other

(2)_____
Circle One: Vice President Secretary Partner Other

(3)_____
Circle One: Vice President Secretary Partner Other

Note: *If incorporated: The names of both the President and Corporate Secretary must be indicated. If a partnership, all partners must be indicated.*

Social Security Number or **FEIN:** _____

Contractor's Georgia License Type and Number: _____

Contractor's Federal Employment Verification Certification:
The Contractor is registered with, authorized to use, is using and will continue to use, the federal work authorization program throughout the term of the contract, and holds the following authorization:

User Identification Number: _____

Date of Authorization: _____

State Where Organized or Incorporated: _____

Plan of Organization: (Circle One) Proprietorship Corporation Partnership Joint Venture Other (Describe)

Years Engaged in Construction Contracting in Present Firm Organization: _____ years.

Bidder Hereby Certifies that bidder:
a. Has never refused to sign a contract at the original bid on a public works contract except as allowed under Georgia law.

b. Has never been terminated for cause on a public works contract.

c. Has had no (criminal or felony) convictions, suspensions, or debarments of the bidder, its officers, or its principals for building code violations, bid rigging, or bribery in the last ten years.

d. Is not and its organization or its principals are not debarred, suspended, declared ineligible, or otherwise excluded by any Federal or State department or agency from doing business with the Federal Government or a State.

e. Has insurance required by the Contract Documents in place or has arranged to obtain it from an insurer authorized to do business in the State of Georgia.

f. Has sufficient bonding capacity to obtain a payment and performance bond from a surety meeting the requirements of the Contract Documents and authorized to do business in the State of Georgia.

g. Has sufficient cash flow to perform this Project.

Remarks or explanations of the above paragraphs a through g:

_____

_____

_____

Bidder Certification

Certification under Oath. Under oath I certify that I am a principal or other representative of the bidder, and that I am authorized by it to execute the foregoing Statement of Bidder's Qualifications is true and correct, including any explanation above and submitted under oath.

BY: _____
Authorized *Signature* *(BLUE INK PLEASE)*

_____
Printed Name Title

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

_____
Notary Public

My commission expires: _____

(SEAL)

NOTE: THE NOTARY SEAL MUST BE APPLIED UNDER GEORGIA LAW, WHETHER OR NOT THE LAW OF THE STATE WHERE EXECUTED PERMITS OTHERWISE.

Statistical Information. This request is made for statistical purposes only.

PLEASE INDICATE BELOW WHICH OF THE FOLLOWING DESCRIPTIONS APPLY TO YOUR COMPANY:

____ MINORITY BUSINESS ENTERPRISE (MBE) – One of the following statements describes this business: **a)** Owned by a member of a minority race; or **b)** a partnership of which a majority of interest is owned by one or more members of a minority race; or **c)** a public corporation of which a majority of the common stock is owned by one or more members of a minority race. A member of a minority race is defined as a person who is a member of a race that comprises less than fifty percent of the total population of the State of Georgia. For recordkeeping purposes, this includes, but is not limited to, persons who are Black, Hispanic, Asian-Pacific American, Native American, or Asian-Indian American.

____ GEORGIA MINORITY BUSINESS ENTERPRISE (GMBE) – Business meets the definition of a minority-owned business and, in addition, meets the following criteria: **a)** was organized in the State of Georgia; or **b)** reports income from the business for Georgia Income Tax purposes; or **c)** minority stockholders report earnings for Georgia Minority Business Enterprise. For more information, please contact the Board of Regents' Office of Business Development by e-mail at BusinessDevelopment@usg.edu.

____ NEITHER DESCRIPTION APPLIES TO YOUR COMPANY.BID SECURITY FORM

KNOW ALL BY THESE PRESENTS, That we, {Insert Contractor's Legal Name and Address} as Principal, hereinafter called the Principal, and {Insert Legal Name and Address of Surety}, a corporation duly organized under the laws of the State of {Insert State of Corporate Organization}, as Surety, hereinafter called the Surety, are held and firmly bound unto:

OWNER: _____

Attention: _____

Phone Number: _____

Facsimile Number: _____

as Obligee, hereinafter called the Obligee in the sum of _____ (Not less than five percent of the Bid) Dollars ($ _____), for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a Bid for _____;
{Insert Owner's Project Number and Project Description}

NOW, THEREFORE, if the Obligee shall accept the Bid of the Principal and (1) the Principal shall enter into a Contract with the Obligee in accordance with the terms of such Bid, and the Principal shall execute the Contract and give such bond or bonds as may be specified in the Bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) in the event of the failure of the Principal to enter such Contract and give such bond or bonds, and the Principal shall pay to the Obligee the difference not to exceed the difference hereof between the amount specified in said Bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said Bid; then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this _____ Day of _____, 20___

Name of Contractor: _____
Principal

_____
Witness

By: _____ (Seal)

_____
Title

Name of Surety: _____
Surety

_____
Witness

By: _____ (Seal) (*)

(*) Attach Power of Attorney

BID REQUIREMENTS
BID SECURITY FORM

NOTE TO CONTRACTOR: Use of Surety's standard

KNOW ALL BY THESE PRESENTS, That we, {Insert Contractor's Legal Name and Address} as Principal, hereinafter called the Principal, and {Insert Legal Name and Address of Surety}, a corporation duly organized under the laws of the State of {Insert State of Corporate Organization}, as Surety, hereinafter called the Surety, are held and firmly bound unto:

OWNER: _____

Attention: _____

Phone Number: _____

Facsimile Number: _____

as Obligee, hereinafter called the Obligee in the sum of _____ (Not less than five percent of the Bid) Dollars ($ _____), for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a Bid for _____;
{Insert Owner's Project Number and Project Description}

NOW, THEREFORE, if the Obligee shall accept the Bid of the Principal and (1) the Principal shall enter into a Contract with the Obligee in accordance with the terms of such Bid, and the Principal shall execute the Contract and give such bond or bonds as may be specified in the Bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) in the event of the failure of the Principal to enter such Contract and give such bond or bonds, and the Principal shall pay to the Obligee the difference not to exceed the difference hereof between the amount specified in said Bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said Bid; then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this _____ Day of _____, 20___

Name of Contractor: _____
Principal

_____
Witness

By: _____ (Seal)

_____
Title

Name of Surety: _____
Surety

_____
Witness

By: _____ (Seal) (*)

(*) Attach Power of Attorney

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SUPPLEMENTARY GENERAL CONDITIONS

GENERAL CONDITIONS
OF THE CONSTRUCTION CONTRACT

SECTION 1 – GENERAL
PART 1 – GENERAL PROVISIONS

1.1.1 General Matters.

1.1.1.1 This Contract and Affiliated Agreements – Requirement for Written Agreements. This Contract and all Affiliated Agreements, including any subsequent modifications, must be in writing, dated, and executed by the parties. Affiliated Agreements, including financial arrangements with respect to this Project, must be promptly and fully disclosed to the Owner upon their execution or modification.

1.1.1.2 Basic Statement of Owner Objectives. The Owner's basic objectives are the construction of the Project within the limits of the funds available to Owner for construction of the Project, and in accordance with the approved Construction Documents.

1.1.1.3 Project Team. To accomplish Owner's objectives, Owner intends to employ a team concept in connection with the construction of the Project. The basic roles and general responsibilities of team members are set forth in general terms below but are more fully set forth in the Design Professional Contract with respect to the Design Professional, in the Program Management Agreement with any Program Manager, and in this Contract with respect to the Contractor.

1.1.1.3.1 Relationship of Parties. The Owner and the Contractor agree to proceed with the Project on the basis of trust, good faith, and fair dealing and to cooperate fully with each other. The Owner and the Contractor shall do all things reasonably necessary to perform this Contract in an economical and timely manner, including without limitation, consideration of design modifications to enhance constructability and alternative materials or equipment, if considered necessary or convenient by the Owner. The Contractor agrees to procure or furnish, as permitted by the laws of Georgia, all Pre-Commencement phase services and construction phase services as set forth herein. The Owner shall endeavor to promote harmony and cooperation among the Owner, Program Manager, Design Professional, the Using Agency, Contractor and other persons or entities employed by the Owner for the Project.

1.1.1.3.2 Design Professional. The Design Professional is retained in accordance with the Design Professional Contract (i) for the design and preparation of Construction Documents that are necessary to implement the Program governing the construction of the Project or Components thereof, and the design and preparation of any necessary documents antecedent to preparation of such Construction Documents, or (ii) for construction contract administration of the Work under Contract Documents, or (iii) for both. The Contractor acknowledges and agrees that the Contract Documents are addressed to skilled tradesmen in the construction profession who shall be required to use their special skills and experience, through submittals and shop drawings, to translate the Design Professional's design intent as expressed in the Contract Documents into a completed structure. The Contract Documents shall specify when shop drawings or submittals require the seal of a specialty consultant.

1.1.1.3.2.1 The basis of the Owner's engagement of the Design Professional is the "Design Professional Contract." The Contractor is advised that both the Owner and the Design Professional have on file, at their respective places of business, copies of that executed agreement. The Design Professional is not the agent of the Owner, except to the extent so specified in writing, but is employed as a consultant to the Owner to assist the Owner in determining if the conditions of the contract have been met. All decisions of the Design Professional on matters of aesthetics are final, conclusive, and binding on all parties if consistent with the requirements of the Contract Documents.

1.1.1.3.2.2 The Contractor promptly shall request and review a copy of the Design Professional Contract during the Pre-commencement Phase and shall become familiar with the respective services, authorities, obligations, and responsibilities of the parties therein. Contractor agrees to develop a working relationship with the Design Professional to effectuate the purposes of the Project in accordance with the terms of this Contract and with consideration of the Design Professional's responsibilities under the Design Professional Contract.

1.1.1.3.2.3 The Contractor acknowledges that the respective contracts require the Owner and the Design Professional to proceed with the Project on the basis of trust, good faith, and fair dealing, and they will take all actions reasonably necessary to ensure the Project proceeds to completion within the Owner's time and budgeting constraints. The Contractor also acknowledges that the Design Professional is to perform all tasks and services required of it under the Design Professional Contract. The Contractor further acknowledges that, in order for the Design Professional to perform its obligations, the Design Professional requires certain materials, information, or other submissions pursuant to the Contract Documents from the Contractor. The Contractor agrees to provide the Design Professional with the submittals required by the Contract Documents. The Contractor further agrees to cooperate with the Design Professional to ensure timely completion of all obligations under this Contract to complete the entire Project.

1.1.1.3.2.4 Contractor agrees that the services provided by the Design Professional under the Design Professional Contract are intended to coordinate and complement, but not to diminish, alter or substitute for, any of the services, authority, obligations, or responsibilities of the Contractor under this Contract. Contractor further agrees that the performance of services by the Design Professional in connection with the Project shall in no way relieve Contractor from any of its services, authority, obligations, or responsibilities under this Contract, and shall not alter or diminish those services, authority, obligations, or responsibilities in any way whatsoever.

1.1.1.3.3 Program Manager. Owner may designate a Program Manager to administer the Project and this Contract. In lieu of a Program Manager, Design Professional may be designated to perform the role of Program Manager. The Program Manager may also be designated as the Owner's Representative, and if no Owner's Representative is designated, the Program Manager shall be the Owner's Representative.

1.1.1.3.4 Owner's Representative. Owner shall from time to time in writing designate one person as Owner's Representative under this Contract. Owner may designate the Program Manager, if any, as the Owner's Representative. Owner's Representative so designated in writing shall serve as Owner's Representative under this Contract unless or until Owner gives notice in writing of the appointment of his successor. Owner or Owner's Representative may designate in writing assistants to serve as Owner's Representative with respect to the Project governed by this Contract or in different phases or in specific areas of responsibility with respect to the Project. All requests for consents and approvals required of Owner in connection with the Project, whether by Program Manager, Design Professional, or Contractor, shall be submitted to Owner's Representative, or if the matter is within the written designation of authority of his assistant, to his designated assistant. Design Professional and Contractor may rely upon written consents and approvals signed by the Owner's Representative, or his designated assistant acting within the scope of his written designation, as the consent and approval of Owner.

1.1.1.3.5 Using Agency, Using Agency's Representative. The Project is intended for the benefit of the Using Agency. A copy of all matters submitted to Owner shall also be submitted to Using Agency for Using Agency's information. The Using Agency may designate one or more representatives to participate with Owner in Owner's activities under this Contract. Neither the Using Agency nor any representative of Using Agency shall have any authority to act for or in the name of the Owner. Participation in the Project by Using Agency or its representative(s) shall be solely advisory to the Owner. The Program Manager, Design Professional, Contractor, or any Separate Contractor must not act or rely solely upon any directive, interpretation, decision, act, or omission of Using Agency or the Using Agency's Representative.

1.1.1.3.6 Owner's Construction Inspector. Owner may from time to time in writing designate a person or firm as Owner's Construction Inspector under this Contract. The Owner's Construction Inspector may be hired by Owner or hired under the Program Manager's Contract or the Design Professional's Contract and shall provide inspection services of the Work on behalf of the Owner. The presence of an Owner's Construction Inspector does not relieve the Contractor of any of its responsibilities for quality control and independent testing set forth in the General Requirements. The Owner's Construction Inspector has the authority to report any deviations from the Contract Documents directly to the Contractor's superintendent at the job site for immediate action, and also to report same to the Program Manager or Design Professional, and Owner.

1.1.1.3.7 Representatives. The designated representatives of the Contractor and the Owner shall have full authority to act (other than for the receipt of notices that must be given as specified in Paragraph 1.1.5) in matters relating to this Contract until notice is given that such authority has been revoked. Contractor and the Owner may each rely upon the written certification of the other as to the appointment of a designated representative or the revocation of his authority. The Contractor shall designate, in writing, a representative authorized to act on the Contractor's behalf with respect to the Project. The Contractor's initial authorized representative shall be the Project Superintendent of the Contractor as identified by the Contractor. Contractor shall employ the Project Superintendent and necessary assistants who shall be in attendance at the Site during the progress of the Work. The Contractor's designee shall represent Contractor: All written communications given to the Contractor's designee shall be binding upon Contractor.

1.1.1.3.8 Separate Contractor. Owner may select one or more Separate Contractors to perform work with respect to the Project or Components thereof. The Contractor shall afford the Owner's Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities and shall coordinate the Separate Contractors' schedules with those of the Contractor. The Owner's Separate Contractors shall adhere to the Contractor's work rules, schedule, laydown areas, and safety requirements.

1.1.1.3.9 Commissioning Authority. Owner may select and employ a Commissioning Authority to perform building commissioning activities and monitor testing activities. The Commissioning Authority shall perform and coordinate and accomplish its work as set forth in Articles 1.3.4 and 2.1.9.

1.1.2 Project Team, Cooperation, Partnering.

1.1.2.1 Concept. It is the Owner's expectation that the Program Manager, Design Professional, Owner, Using Agency, Contractor, and any Separate Contractor, shall work as a Project Team to effect the commencement of and completion of construction in accordance with the Project Schedule, and to achieve Final Completion of the Project. Each team member shall communicate with all other team members to assure overall coordination, cooperation, and efficiency. Each team member shall cooperate fully with and coordinate fully with each other team member in order to achieve Project completion in an expeditious and economical manner. The Contractor shall schedule regular meetings of the key principals of the Project Team in an effort to solve problems in a partnering atmosphere to facilitate the ability of each team member to meet its business objectives, so long as its business objectives are consistent with the successful completion of the Project. It is the Owner's intent that all consensus decisions of the Project Team, where differing from the Contract Documents, be reduced to writing in an appropriate Change Order.

1.1.2.2 Conference. Promptly after the execution of this Contract, Contractor shall confer with the Program Manager, Design Professional, Owner, and Using Agency to identify personnel and relevant organizational charts of each team member, and to establish working relationships with each team member.

1.1.2.3 Authority of Contractor. Contractor is, and at all times during the term of this Contract shall be, an independent contractor in the performance of its duties and obligations under this Contract. Contractor shall have no authority to bind or otherwise obligate Owner, orally, in writing or by any acts, unless specifically authorized by Owner in writing. Nothing contained in this Contract shall constitute or be deemed or construed to create a partnership or joint venture, or any agency relationship, between Owner and Contractor.

1.1.2.4 Team Evaluation Process, Covenant not to Sue. If Team Evaluation is elected as part of this Contract, all team members agree to participate in good faith in the State of Georgia's formal Team Evaluation Process [copies of which will be made available to any bidder on request]. By executing this agreement for construction services with the Owner, the Contractor waives any and all legal rights for defamation, libel or slander and covenants not to sue the Board of Regents, the Owner, the Design Professional, the Using Agency, other team members, and their respective representatives and agents for comments, rankings, and results related to the Contractor's performance posted in good faith as a part of, and in accordance with, said Team Evaluation Process. The Design Professional and other team members, in their agreements with the Owner, have executed, or will execute, a similar agreement.

1.1.3 Constitutional Principles Applicable to State Public Works Projects.

1.1.3.1 Title to Project Site**.** Title to the Site is vested in the Board of Regents of the University System of Georgia as public property of the State of Georgia, and is not subject to levy or lien.

1.1.3.2 Title to Improvements and Delivered Materials. Title to all improvements constructed at the Site vests *instanter* in the Board of Regents. Title to all materials vests in the Board of Regents upon their delivery without rejection by the

Contractor at the Site, regardless of the status of payment or nonpayment of the costs thereto. Protection of laborers and Suppliers (regarding payment for services and materials) is effected through the provision of payment and performance bonds by the State.

1.1.3.3 Limited Waiver of Sovereign Immunity *Ex Contractu*. Contractor acknowledges and agrees that Owner is an agency or instrumentality of the State of Georgia, and as such is entitled to the protection of sovereign immunity. As set forth in Article I, Section II, Paragraph IX of the 1983 Georgia Constitution, sovereign immunity is waived "as to any action *ex contractu* for the breach of any written contract." Contractor specifically acknowledges the constitutional and contractual requirements that written changes, modifications, and waivers to this Contract must be specifically executed by the Owner as set forth in the Contract Documents. Accordingly, Contractor specifically acknowledges the constitutional prohibitions against claims against Owner based solely upon oral statement, course of conduct, customs of the trade, quasi-contract, *quantum meruit*, or O.C.G.A § 13-4-4 (mutual departure from contract terms).

1.1.3.4 Limitations upon Authority of Agents. Contractor further acknowledges that Owner is an agency or instrumentality of the State of Georgia, and as such acts through specific public officials. The legal concepts of agency applicable to the Owner are solely as set forth in O.C.G.A. §45-6-5 and as further specified in the Contract Documents. Contractor specifically acknowledges the statutory and contractual requirements that written changes, modifications, and waivers to this contract must be executed only by the identified representatives of Owner as set forth in the Contract Documents. Accordingly, Contractor specifically acknowledges that any claims against Owner based upon the act of any non-authorized employee or official are invalid.

1.1.3.5 U.C.C. Not Generally Applicable. Contractor further acknowledges and agrees that Owner, as set forth in subsection (3) above, has granted only a limited waiver of sovereign immunity, such that the provisions of the Uniform Commercial Code (O.C.G.A §11-1-101 through §11-2-725) governing sales of goods do not apply to this Contract. Contractor specifically acknowledges the contractual requirements that written changes, modifications, and waivers to this contract must be specifically executed by the Owner as set forth in the Contract Documents. Accordingly, Contractor specifically waives and covenants not to make against Owner any claims based upon the Uniform Commercial Code. Contractor understands, however, that Contractor's subcontracts with Suppliers and Subcontractors may in fact include sales of goods and therefore be properly governed by the Uniform Commercial Code; nonetheless Contractor covenants that any such application shall in no way be construed to have any legal effect upon this contract between Owner and Contractor.

1.1.4 Third Party Beneficiary. Contractor acknowledges, stipulates, and agrees that the Owner is a public department, agency, or commission of the executive branch of government of the State of Georgia performing an essential public and governmental function by means of the Contract. Contractor acknowledges, stipulates, and agrees that the Using Agency is an express third party beneficiary of this Contract. There are no individual or personal third party beneficiaries of this Contract.

1.1.5 Notice.

1.1.5.1 General Requirement. Any notice, election, demand, request, consent, approval, or other communication required or permitted to be given under this Contract shall be in writing signed by an officer or duly authorized representative of the party making same and shall be delivered personally or shall be sent by certified or statutory mail, postage prepaid, return receipt requested, shall be effective as of the date on which it is received or would have been received but for the refusal of the addressee to accept delivery, and shall be addressed as shown in the Contract. The persons and addresses to which notices should be given may be changed by notice given in accordance with this Article.

1.1.5.2 Copies of Notices to Owner. Wherever the Contract Documents provide that a copy of any notice, request, or demand filed with the Design Professional by the Contractor shall be furnished to the Owner, such notice, request, or demand shall not become effective until the Owner has received his copy. No notice in writing or given orally to the Design Professional or to the Contract Compliance Specialist is notice to the Owner unless copy of the aforesaid notice in writing shall have been properly served upon the Owner at the address shown in the Contract.

1.1.6 Liquidated Damages.

1.1.6.1 Time of the Essence. Time being of the essence of this Contract, and a material consideration thereof, it is mutually agreed by the parties hereto in case of the Contractor's failure to complete the construction within the time specified, the Owner will be damaged thereby. The Contractor shall commence performance of the Work on the Site under this Contract as of the Proceed Order Date. The Contractor shall complete construction, except for Minor Items and Permitted Incomplete Work (*see* Article 6.1.1), not later than the Material Completion and Occupancy Date, as adjusted by Change Order.

1.1.6.2 Liquidated Damages. Because it is difficult to definitely ascertain and prove the amount of said damages, inclusive of, but not limited to, expenses for inspection, superintendence, loss of use, and necessary traveling expenses, the Owner, Contractor, and Using Agency hereby agree that the amount of such damages shall be the daily

rate specified in the Contract, beginning upon the contractually required Material Completion and Occupancy Date and ending on the date that the Certificate of Material Completion is issued. The parties agree that the specified Liquidated Damages are not established as a penalty but are calculated and agreed upon in advance as a fair and equitable amount reasonably estimated in advance to cover losses to be incurred by the Owner and Using Agency for such delay or interruption in view of the uncertainty and impossibility of ascertaining actual damages that would be incurred.

1.1.6.2.1 Contractor Agrees to Pay. The Contractor agrees to pay the amount, computed by multiplying the Liquidated Damages set forth in the Contract by the number of days between the contractually required Material Completion and Occupancy Date and the date that the Certificate of Material Completion is issued.

1.1.6.2.2 Deducted as They Accrue. Liquidated Damages shall be deducted from periodic payments as they accrue and such deduction shall be in addition to the retainage provided for in the Contract. The remaining balance of any Liquidated Damages shall be deducted from the Payment for Material Completion to the Contractor or its Surety. If the unpaid balance of the Contract Sum is less than the total amount to be deducted for Liquidated Damages as herein above provided, the Contractor shall promptly pay to the Owner, upon the Owner's demand, the amount by which such sum exceeds the unpaid balance of the Contract Sum.

1.1.6.3 Limitation on Owner's Damages. Except as otherwise set forth in the Contract Documents, damages of the Owner and Using Agency for delay shall be limited to the Liquidated Damages as defined herein. Nothing in this Article 1.1.6 shall be construed to limit Owner's right to pursue damages or remedies for claims against the Contractor for reasons other than delay.

1.1.7 Documents.

1.1.7.1 Precedence of Documents and Changes. In the event of conflict, the Contract takes precedence over the Supplementary Conditions, and the Supplementary Conditions take precedence over the General Conditions. No change to the Contract Documents is effective unless notice shall have been issued by the Owner bearing the imprimatur of the Owner as follows:

"By order of the Board of Regents of the University System of Georgia, Owner."

The Design Professional has no authority to amend the Contract Documents, orally or in writing, either expressly or by implication.

1.1.7.2 Copies of Contract Documents to Contractor. Without charge to the Contractor the Design Professional shall furnish to the Contractor up to five sets of completed Contract Documents in hardcopy, one set of reproducible and electronic background floor and reflected ceiling plan drawings and, if requested, one copy in read-only electronic format. The Contractor may obtain such additional sets of Contract Documents, as the Contractor deems necessary and shall pay the cost of reproduction of such additional sets to the Design Professional.

1.1.7.3 Marked-Up ("As-Built") Documents. Prior to Final Completion, the Contractor shall provide one complete set of Marked-Up Documents to the Design Professional. The Marked-Up Documents shall consist of the Contract Documents annotated and changed to reflect the as-built condition of the Project, including all Change Orders, field instructions, answers to RFI's, clarifications, sketches, delegated contractor design drawings and locations of utilities and other hidden elements.

1.1.7.4 Copies to the Owner. Upon Owner's request, the Contractor shall furnish the Owner with copies of Project related correspondence, letters of transmittal, etc.

1.1.8. Defined Terms. Wherever used in the Contract Documents, the terms defined in this Contract will have the meanings indicated that are applicable to both the singular and plural, and to the masculine and feminine thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents may include references to identified articles and paragraphs, and the titles of other documents or forms.

1.1.8.1 Meaning of Words and Phrases. Unless the context or the Contract Documents taken as a whole indicate to the contrary, words used in the Contract Documents that have usual and common meanings shall be given their usual and common meanings; words having technical or trade meanings shall be given their customary meaning in the subject business, trade, or profession. Materials or work described in words that, so applied, have a well-known technical or trade meaning shall be held to refer to such recognized meaning.

1.1.8.2 Cross-References, Headings, and Citations to the Contract. Cross-references, headings, and citations to the Contract, if any, are for the convenience of the Contractor and the Owner and are not intended to be plenary or exhaustive nor are they to be considered in interpreting the Contract Documents or any part of the Contract Documents.

1.1.8.3 Install, Deliver, Furnish, Supply, Provide and Other Such Words. Install, deliver, furnish, supply, provide, and other such words mean that the Work in question shall be put in place by the Contractor ready for use unless expressly provided to the contrary.

1.1.8.4 Articles Not Plenary. This Article and Article 1.1.9 are not entire, plenary, or exhaustive of all terms used in the Contract and General Conditions that require definition. There may be definitions of other terms under articles to which the terms are related.

1.1.9 Basic Definitions.

1.1.9.1 *Addenda*. Written or graphic instruments issued prior to the opening of bids that clarify, correct, or change any of the component parts of the Bidding documents.

1.1.9.2 *Affiliate*. With respect to Contractor, any firm, partnership, corporation or other legal entity that is owned by, under common ownership or control with, or having a common principal or shareholder with, the Contractor, whether such relationship is direct or indirect. In addition, unless the consequences of such relationship for the purposes of this Contract are expressly waived in writing by the Owner after full disclosure by the Contractor, the term "Affiliate" also includes any entity currently affiliated with Contractor as a partner or joint venturer with respect to any commercial venture, whether or not such venture includes the Project. See O.C.G.A. §13-10-23.

1.1.9.3 *Affiliated Agreement*. Any agreement concerning the Project between the Contractor and an Affiliate, including all modifications and amendments thereto.

1.1.9.4 *Application for Payment*. The form acceptable to Owner that is to be used by the Contractor during the course of the Work in requesting payment from the Owner and that is to be accompanied by such supporting documentation as is required by the Contract Documents.

1.1.9.5 *Asbestos*. Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

1.1.9.6 *Authorization for Using Agency to Enter.* The Notice from Owner to the Contractor and the Using Agency, upon issuance of a Certificate of Material Completion, that the Using Agency is authorized to take possession of the Project.

1.1.9.7 *Bid. The* offer of a Bidder submitted on the prescribed form setting forth the Contract Sum for all activities required by the Bidding Documents.

1.1.9.8 *Bid Bond.* A bond, required by law, with a surety in accordance with the Instructions to Bidders, substantially in the form and substance specified in the Bidding Documents, with the Owner as obligee, and intended to secure the execution of the Contract by the Bidder.

1.1.9.9 *Bidding Documents.* The Construction Documents, the Invitation to Bid, the Instructions to Bidders, the Bid Form, and all Addenda, upon which the Bidder submits a Bid.

1.1.9.10 Bulletin Written or graphic material issued after the award of the contract that clarifies, corrects, or proposes a change in any of the component parts of the Contract Documents.

1.1.9.11 *Business Day.* A business day is each calendar day other than Saturday, Sunday, and any holiday observed by Owner.

1.1.9.12 *Change Order.* A document issued on or after the Effective Date of the Contract, signed by the Contractor and the Owner and ordinarily certified by the Design Professional, which may authorize a change or changes, including but not limited to a change to the Contract Sum, the Contract Time, or the Contract Documents

1.1.9.13 *Claim.* A demand or assertion by the Owner or the Contractor seeking an adjustment of the Contract Sum or Contract Time, or both, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and the Contractor arising out of or relating to the Contract. The

responsibility to substantiate a Claim shall rest with the party making the Claim. A demand for money or services by a third party, including a Trade Contractor, Supplier, or subcontractor to the Contractor, is ipso facto not a Claim against the Owner.

1.1.9.14 *Construction Documents.* The architectural and engineering documents setting forth the design for the Project prepared by the Design Professional. Construction Documents include, but are not limited to, the Specifications, the Drawings, the Supplementary Conditions, the General Conditions, and all Addenda.

1.1.9.15 *Construction Progress Schedule*. A schedule indicating proposed activity sequences and durations, milestone dates for receipt and approval of pertinent information, preparation, submittal, and processing of Shop Drawings and Samples, delivery of materials or equipment requiring long-lead time procurement, and proposed date(s) of Material Completion and Occupancy and Final Completion. The schedule will be developed to represent the sixteen or seventeen CSI Specification Divisions. It shall have a minimum number of activities as required to adequately represent to Owner the complete scope of work and define the Project's critical path and associated activities. If the Project is to be phased, then each individual Phase should be identified from start through completion of the overall Project and should be individually scheduled and described, including any Owner's occupancy requirements and showing portions of the Project having occupancy priority. The format of the schedule will have dependencies indicated on a monthly grid identifying milestone dates such as construction start, phase construction, structural top out, dry-in, rough-in completion, metal stud and drywall completion, equipment installation, systems operational, Material Completion and Occupancy Date, final inspection dates, Punchlist, and Final Completion date.

1.1.9.16 *Contract.* The written document that is the evidence of the Contract between the Owner and the Contractor.

1.1.9.17 *Contract Compliance Specialist*. A person, if so designated by the Owner, to record daily events at the Site, including deliveries of equipment and supplies, and the progress of the Work. The Contract Compliance Specialist is not an inspector, and has no authority or power to act as agent for the Owner or to approve or disapprove any action of the Contractor. The Contract Compliance Specialist has no authority to and shall not be requested to sign or initial documents such as delivery receipts, drayage or hauling receipts, or time and materials tickets, or other similar documents evidencing transactions among the Contractor and Subcontractors.

1.1.9.18 *Contract Documents.* The Contract Documents include the executed Contract, the Bid, the Bidding Documents, and all Change Orders.

1.1.9.19 *Contract Sum.* The amount of money payable by the Owner to the Contractor for completion of the Pre-Commencement Services and the Work in accordance with the Contract Documents.

1.1.9.20 *Contract Time.* The period of time established for completion of the Project by the Contract Documents. Contract Time commences upon the date specified in the Proceed Order and ends upon the Material Completion and Occupancy Date, as it may be amended.

1.1.9.21 *Contractor.* The person or entity responsible for the proper completion of the activities described in the Contract Documents and who executes the Contract.

1.1.9.22 *Cost of the Work.* The sum of all allowable costs necessarily incurred and paid by Contractor in the proper performance of the Work.

1.1.9.23 Day. Unless otherwise stated, reference to the terms "day," "days," "month," or "months" mean calendar day, calendar days, calendar month, and calendar months, respectively.

1.1.9.24 *Defective Work.* Work that, for any reason, is not in compliance with the Contract Documents. Defective Work is usually identified in a Notice of Non-Compliant Work.

1.1.9.25 *Design Professional Contract.* The Contract between the Owner and the Design Professional for the design of the Project.

1.1.9.26 *Design Professional.* The architect or engineer or architectural or engineering firm selected by Owner (i) for the design and preparation of Contract Documents governing the construction of a Project, or (ii) for construction contract administration under the Contract Documents, or (iii) for both, all such services and the scope thereof to be set forth in the Design Professional Contract. The Design Professional is not an employee of the Owner but is engaged or retained by it for the purpose of performing design and construction administration services for the project. The term "Design Professional" includes architects, engineers, surveyors, designers, and other consultants retained by the Design Professional.

1.1.9.27 *Drawings*. That part of the Contract Documents prepared or approved by the Design Professional that graphically show the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

1.1.9.28 *Effective Date of the Contract*. The date indicated on the Contract or as otherwise specified therein.

1.1.9.29 *Final Certificate, Design Professional's Certificate of Final Completion*. The Certificate issued by the Design Professional stating that all work has been completed in accordance with the terms of the Contract Documents. See Section 6, Project Completion.

1.1.9.30 *Final Completion*. The full and final completion of all Work in accordance with the Contract Documents.

1.1.9.31 *Final Notice of Non-Compliant Work*. The Final Notice of Non-Compliant Work issued as a result of the Inspection for Material Completion, also known as the Final Punch List. Upon the completion or correction of this Non-Compliant Work ("punch list" work) the Design Professional will issue the Final Certificate.

1.1.9.32 *Hazardous Substances*. See Section 1 Part 6.

1.1.9.33 *Material Completion and "Material Completion and Occupancy Date"*. See Section 6 Part 1.

1.1.9.34 *Milestone*. A principal event specified in the Contract Documents including the Material Completion and Occupancy Date and other events relating to an intermediate completion date or time.

1.1.9.35 *Notice*. Written notice. See Article 1.1.5

1.1.9.36 *Notice of Apparent Successful Bid*. The written notice by the Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, the Owner will sign and deliver the Contract. The Construction Preparation Period begins on the Effective Date of the Contract. (See Section 2, Part 1.)

1.1.9.37 *Notice of Non-Compliant Work*. A Notice of Non-Compliant Work shall be in writing, shall be dated, shall be signed by the Design Professional, and shall be addressed to the Contractor with a copy to the Owner, as set forth in Section 3, Part 4 (Correcting the Work) and Section 6, Part 6 (Correcting the Work after Final Payment).

1.1.9.38 *Owner*. The Board of Regents, by and through a State Agency, identified as such in this Contract with whom Contractor has entered into the Contract and for whom the Work is to be completed.

1.1.9.39 *Overall Project Schedule*. The Construction Progress Schedule that is approved by the Owner.

1.1.9.40 *Pre-Commencement Phase Services*. The services required to be provided by the Contractor for the Pre-Commencement Phase of the Project in accordance with the Contract Documents.

1.1.9.41 *Proceed Order*. The Proceed Order is a written notice from the Owner that includes a specified date (i.e. the *Proceed Order Date*) upon which the Contractor is authorized to commence physical work on the Site. Unless the Proceed Order states otherwise, the Proceed Order Date shall be the date upon which the Proceed Order is actually signed and dated by the Owner's authorized representative. A Proceed Order is a condition precedent to the execution of any Work on the site by the Contractor. The Proceed Order was formerly referred to as the "Notice to Proceed."

1.1.9.42 *Project*. The total and complete undertaking for the public works facility to be constructed under this Contract.

1.1.9.43 *Project Manual*. A bound manual prepared by the Design Professional. It includes the Invitation to Bid, Instructions to Bidders, the Bid Form, the Specifications, the General Conditions and Supplementary General Conditions.

1.1.9.44 *Resident Engineer Inspector*. Synonymous with Contract Compliance Specialist. See Paragraph 1.1.9.16.

1.1.9.45 *Samples*. Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged. The Contractor shall furnish for approval all samples required by the Contract Documents. The Work shall be in accordance with approved samples.

1.1.9.46 *Separate Contractor*. Any person or entity other than Contractor that enters into an agreement with Owner to perform the construction of all or any portion of the construction on a Project.

1.1.9.47 *Site*. Lands or areas indicated in the Contract Documents as being furnished by the Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by the Owner that are designated for the use of the Contractor. Also referred to as Project Site, Job Site and Premises.

1.1.9.48 *Specifications*. That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto. The term "Specifications" shall also include all written matter in the Project Manual or on the drawings and any Addenda or Change Orders thereto.

1.1.9.49 *Subcontractor*. The generic term subcontractor as employed herein includes only those having a direct contract with the Contractor.

1.1.9.50 *Submittals*. Shop Drawings, schedules, data, catalogue cuts, manufacturers' published recommendations, charts, bulletins, brochures, illustrations, circulars, roughing drawings or formulae, etc., that are specifically prepared, distributed, or assembled by or for Contractor or by Subcontractors, manufacturers, or Suppliers and submitted by Contractor to illustrate some portion of the Work or for use in installing the Work. The Contract Documents shall specify when shop drawings or submittals require the seal of a specialty consultant.

1.1.9.51 *Successful Bidder*. The responsible Bidder submitting the lowest responsive Bid.

1.1.9.52 *Supplier*. A manufacturer, fabricator, distributor, supplier, or vendor of goods or equipment in connection with the Work, or any other party having a Contract or Purchase Order with the Contractor or with a Subcontractor to furnish materials or equipment to be incorporated in the Work by the Contractor or a Subcontractor.

1.1.9.53 *Trade Contractor*. A Subcontractor who furnishes and installs materials according to the plans and specifications of this Project but does not include one who merely furnishes materials. See 1.1.9.49.

1.1.9.54 *Underground Facilities*. All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including without limitation those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

1.1.9.55 *Unit Price Work*. Work to be paid for on the basis of unit prices as defined and described in the Contract Documents. A percentage markup for overhead or profit shall be included in all unit prices.

1.1.9.56 *Using Agency*. The State entity for which the Project is being constructed. The term may include an institution (e.g., University of Georgia) that is a part of the Board of Regents of the University System of Georgia.

1.1.9.57 *Using Agency's Representative*. The Using Agency may designate from time to time a Using Agency's Representative, who shall work with the Design Professional and the Owner's Representative as a liaison with the Using Agency.

1.1.9.58 *Work*. All labor, materials, and services necessary to produce the construction of the Project in accordance with the Contract Documents, including the entire construction or the various separately identifiable parts thereof. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all equipment, fixtures, and supplies into such construction, all as required by the Contract Documents.

PART 2 – CONTRACTOR'S GENERAL RESPONSIBILITIES AND DUTIES

1.2.1 Contractor's General Responsibilities.

1.2.1.1 Representations of Contractor.

1.2.1.1.1 Independent Contractor. The Contractor represents that it is an independent contractor, competent, knowledgeable, and familiar with the type of work contemplated by this Contract. The Contractor agrees and understands that neither it nor any of its agents or employees may act in the name of the Owner except and unless specifically authorized in writing by the Owner to do so. The Contractor shall furnish construction administration and management services and use the Contractor's best efforts to perform the Project in an expeditious and economical manner consistent with the interests of the Owner.

1.2.1.1.2 Familiarity with Project. Contractor represents that it has: (a) visited and examined the Site(s), (b) taken into account local conditions and observed conditions that affect the Project, the Work, or the cost thereof, (c) investigated the labor situation related to the Project, (d) examined the superintendence of the Project, the Work, the time of completion, and other relevant matters, and (e) has taken these into consideration in submitting his bid.

1.2.1.2 Responsibility to Coordinate. Contractor acknowledges its responsibility to coordinate the Work with that of Separate Contractors to be selected for the installation of other work within the Project, or in the proximity of the Project. Contractor expressly agrees to schedule and, with the assistance of Owner, coordinate the Work with such Separate Contractors and to permit each phase of the Project to be completed on schedule.

1.2.1.3 Project Delivery. Contractor shall construct the Project in accordance with the Contract Documents, and Contractor shall deliver the Project completed in accordance with the Contract Documents, substantially free from defects, and within the Contract Time.

1.2.1.4 Contractor's Warranty as to Performance. The Contractor warrants that he is familiar with the codes applicable to the Work and that he has the skill, knowledge, competence, organization, and plant to execute the Work promptly and efficiently in compliance with the requirements of the Contract Documents. The Contractor has the obligation to keep a competent superintendent on the Work during its progress, to employ only skilled workers, and to enforce strict discipline and good order among his employees. The Contractor is responsible for seeing that the Work is installed in accordance with the Contract Documents. Failure or omission on the part of the Owner, representatives of the Owner, agents of the Owner, the Contract Compliance Specialist, engineers employed by the Design Professional, representatives of the Design Professional, or the Design Professional either to discover or to bring to the attention of the Contractor any deviation from, omission from, or noncompliance with the Contract Documents shall not be used by the Contractor or its surety as a defense for failure on his part to install the Work in accordance with the Contract Documents or for any other neglect to fulfill requirements of the Contract; neither shall the presence of any one, or all, or any of the foregoing at the Site or the fact that any one, or all, or any of the foregoing may have examined the Work or any part of the Work be used as a defense by the Contractor against a claim for failure on his part to install the Work in accordance with the Contact Documents or for any neglect to fulfill requirements of the Contract. No requirement of this Contract may be altered or waived except by Change Order.

1.2.2 Contractor's General Duties.

1.2.2.1 Construction Staging and Construction Services. The Contractor shall provide and pay for all labor, materials, equipment, transportation, construction, resources, work, and services necessary or incidental to completing the Work for each phase of the Project in a proper and timely manner in accordance with the Contract Documents and applicable laws.

1.2.2.2 Supervision and Direction. Contractor shall supervise and direct the Work using diligent skill and attention. Contractor shall be responsible for and shall coordinate all construction means, methods, techniques, sequences, and procedures. (*See* Article 3.1.1 *et seq.*)

1.2.2.3 Enforce Discipline. Contractor shall at all times enforce strict discipline and good order among its employees, Subcontractors, and others performing the Work, and shall not employ or permit the employment of unfit persons or persons not skilled in the task assigned to them.

1.2.2.4 Security Clearances. Where work is required within a specially secured controlled access environment, work shall be performed by personnel who have passed a security screening.

1.2.2.5 Maintain Records. Contractor shall keep Owner informed of the progress of the Work. Contractor shall maintain records of the cost for the Work pursuant to and in compliance with GASB 34 accounting requirements and such other methods as Owner may require, including complete backup documentation for all pay applications.

1.2.2.6 Answer Questions. Contractor, with reasonable promptness and in accordance with time limits set by Owner, shall answer Owner's questions and provide Owner with requested Project information.

1.2.2.7 Acts and Omissions. Employees of or Subcontractors to the Contractor shall perform the Work required by this Contract. The Contractor is responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons.

1.2.2.8 Contractor. Contractor shall, in coordination with the Design Professional, accomplish the construction of the Project, including all required submittals, and such Change Orders as may be issued.

1.2.2.9 Meetings with the Owner. Contractor shall schedule and conduct meetings with the Owner, Design Professional, Separate Contractors, and appropriate Subcontractors, not less than biweekly, for the purpose of discussing the status and progress of the Work. Such meetings shall be held as often as Owner determines.

1.2.2.10 Schedule and Coordination Meetings. Contractor shall schedule and conduct meetings as necessary with Subcontractors, Suppliers, and other appropriate Project Team Members to coordinate and schedule the Work.

1.2.3 Audit. At the request of the Owner, the Contractor shall allow the Owner the opportunity to select an auditor to examine and inspect the Project and the Contractor's books, records, and any and all accounts and similar data related to the Project. The Owner shall bear the cost of such audit. The auditor may sign a confidentiality agreement before conducting any such audit. Notwithstanding such agreement, Contractor understands and agrees that all project records are subject to the Georgia Open Records Act.

1.2.4 Employment of Georgia Citizens and Use of Georgia Products and Georgia Forest Products. Given that the Work provided for in this Contract is to be performed in Georgia, it is the wish of the Owner that materials and equipment manufactured or produced in Georgia shall be used in the Work and that Georgia citizens shall be employed in the Work at wages consistent with those being paid in the general area in which the Work is to be performed. This desire on the part of the Owner is not intended to restrict or limit competitive bidding nor to increase the cost of the Work; nor shall the fulfillment of this desire be asserted by the Contractor as an excuse for any noncompliance or omission to fulfill any obligation under the Contract. O.C.G.A. §§50-5-60 to 63 are further incorporated into the General Conditions of the Contract as expressed below:

(a) No contract for the construction of, addition to, or repair of any facility, the cost of which is borne by the State, or any department, agency, commission, authority, or political subdivision thereof shall be let, unless said contract contains a stipulation therein providing that the Contractor, Construction Manager or Subcontractor shall use exclusively Georgia forest products in construction thereof, when forest products are to be used in such construction, addition or repair, and if Georgia forest products are available.
(b) These provisions shall not apply when in conflict with Federal law, rules, and regulations concerning interstate commerce or construction.

PART 3 – OWNER'S GENERAL RESPONSIBILITIES AND RIGHTS

1.3.1 Owner's Representative.

1.3.1.1 Written Designation. The Owner shall designate, in writing, a representative authorized to act on the Owner's behalf with respect to the Project. The Owner hereby designates the party identified in the Contract as its initial authorized representative and reserves the right to designate additional or replacement representatives by written notice to the Contractor.

1.3.1.2 Accessibility. The Owner's Representative shall be readily accessible (either on site or by computer, phone, fax or otherwise), shall be well acquainted with the Project, and shall have authority promptly to render decisions and to furnish information required of, or to be provided by, the Owner hereunder.

1.3.1.3 Independent Review and Inspection. The Owner may undertake independent inspection of the installation of the Work. Such independent inspector shall operate on behalf of the Owner and shall act to protect the best interests of the Owner.

1.3.2 Design Professional.

1.3.2.1 Design Professional to Design Work. The Design Professional Contract requires the Design Professional to design and to prepare the Contract Documents, a copy of which shall be furnished to the Contractor upon request. The Design Professional Contract requires the Design Professional to designate a readily accessible representative (either on Site or by computer, phone or fax or otherwise) who shall have authority promptly to render decisions and to furnish information required of the Design Professional.

1.3.2.2 Copies of Contract Documents to Contractor. The Design Professional Contract requires that the Contractor be furnished, free of charge, up to ten sets of completed Contract Documents in hard copy, one full set of reproducible drawings and electronic background floor and reflected ceiling plan drawings and, if requested, one complete copy in read-only electronic format. The Contractor may obtain such additional sets of Contract Documents as the Contractor deems necessary and shall pay the cost of reproduction of such additional sets to the Design Professional.

1.3.2.3 Contract Administration. The Design Professional shall provide periodic review of the Work to assess compliance with the Contract Documents. The Design Professional shall not review any Work in respect to safety. The Design Professional is not the agent of the Owner, but is engaged as a consultant to the Owner to assist the Owner in determining if the conditions of the contract have been met. He is the agent of the Owner only when in special instances he is authorized in writing by the Owner so to act, and in such instances he shall, upon request, show the Contractor written authority. He has authority to stop the Work whenever such stoppage may be necessary to enforce the proper execution of the Contract.

1.3.2.4 Impartial Decisions. The Design Professional is the interpreter of the conditions of the Construction Contract and the judge of its performance, in the first instance. The Design Professional shall side neither with the Owner nor with the Contractor, but shall use its powers to enforce performance by both.

1.3.2.5 Design Professional Decisions. Design Professional's decisions must be in writing and signed by the Design Professional of Record.

1.3.2.5.1 Promptness. The Design Professional shall make decisions within fourteen calendar days after proper presentation of evidence on (1) any issue, claim, or dispute of the Owner or Contractor, or (2) a demand of the Owner or Contractor for a decision on any matter relating to the execution or progress of the Work.

1.3.2.5.2 Additional Time. If because of events beyond the Design Professional's reasonable control, it is not able to meet the specified time period, then it should be entitled to ask the Owner for additional time, which request shall not be unreasonably denied.

1.3.2.5.3 Protests of Design Professional's Decisions. All decisions of the Design Professional on any claim, dispute, or demand shall be final and binding on the Contractor in the absence of written notice of protest from the Contractor received by the Owner within fourteen calendar days of the date of the decision of the Design Professional is received by the contractor. See Section 5 Part 2.

1.3.2.6 Aesthetics. All decisions of the Design Professional on matters of aesthetics are final, conclusive, and binding on all parties if consistent with the requirements of the Contract Documents.

1.3.2.7 Succession. In case of the termination of the employment of the Design Professional, the Owner shall appoint a capable and reputable Design Professional against whom the Contractor makes no reasonable objection and whose status under the Contract shall be that of the former Design Professional.

1.3.3 Permits, Licenses, and Inspections. The Owner shall cooperate with the Contractor in obtaining building and other permits, licenses, and inspections. *See also* Subparagraph 2.1.2.2.3 and Article 2.1.5.

1.3.4 Testing. The Owner shall provide and pay for initial and subsequent independent construction testing as required by the Contract Documents. Laboratories for testing services shall be selected by, engaged by, and responsible to the Design Professional. In the case of tests (a) prescribed in the Contract Documents or any part thereof, or (b) requested by the Design Professional, the Contractor must give notice to the selected testing agency stating the date and the hour when he will be ready for the test to be made. In the event the test fails or the Contractor is not ready for the test, the expense of the services of the testing laboratory shall be deducted from the Contract Sum, upon notice to the Contractor by the Owner accompanied by a copy of the invoice for the testing services for the test that failed or for which the Contractor was not ready. The notice and readiness provisions of this article do not apply to verification of design mix on concrete.

1.3.5 No Partial Occupancy. There shall be no partial occupancy by the Using Agency of the Project prior to the achievement of Material Completion. This provision may be modified in the Supplementary General Conditions only for phased construction projects with stand-alone components, or may be modified by Change Order.

1.3.6 Disqualification of Potential "Pre-Qualified" Subcontractors. The Owner may disqualify for just cause any pre-qualified potential subcontractors identified in the Bidding Documents. Owner shall pay any difference in the cost of the Work resulting from such disqualification.

1.3.7 Owner's Right to Perform Work. The Owner reserves the right to perform construction or operations related to the Project with Separate Contractors on the Site. If the Contractor claims that delay or additional cost is because of such action by the Owner, the Contractor shall assert such claims as provided in Section 5, Part 2 of the General Conditions.

PART 4 – PROTECTION OF PERSONS AND PROPERTY

1.4.1 Reasonable Precautions. The Contractor shall take reasonable precautions for the safety of, and shall provide reasonable protection to prevent damage, injury or loss to: (a) employees performing the Work and other persons, including without limitation the General Public, who may be affected thereby; (b) the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site, under care, custody, or control of the Contractor or the Contractor's Subcontractors; or (c) other property at or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation, replacement or other rearrangement in the course of construction.

1.4.2 Duty to Protect Property. The Contractor shall continuously maintain adequate protection of the Work from damage and shall protect all other property on the Site from damage, injury, or loss regardless of who may be the owner of said property. He shall make good any such damage, injury, or loss.

1.4.3 Safety Precautions. The Contractor shall comply with the rules and regulations of OSHA and the Department of Labor (O.C.G.A. Section §34-2-6), and, where not inconsistent with the foregoing, the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc., for safety and prevention of accidents, and shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work arising out of and in the course of employment on work under the Contract. The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage that may result from their improper construction, maintenance, or operations. He shall erect and properly maintain at all times, as required by the conditions and progress of the Work, proper safeguards for the protection of workers and the public and shall post danger warnings against any hazards created by the construction operations. The Contractor shall designate a responsible member of his organization, normally the superintendent, whose duty shall be the prevention of accidents.

1.4.4 Emergencies. In an emergency affecting the safety of persons or property or the Work or of adjoining property, the Contractor shall take reasonable precautions to prevent imminent damage, injury, or loss.

1.4.5 Fire Protection. Contractor shall take adequate and reasonable precautions to protect the Work against damage by fire and smoke. For example, without limitation, Contractor shall do the following:

(a) Provide fire extinguishers or fire hoses in readily accessible locations;
(b) Periodically inspect fire extinguishers, remove discharged extinguishers immediately, and replace with new or recharged extinguishers;
(c) Keep fire extinguishers or fire hoses within five (5) feet of any welding or open flame operations;
(d) Remove oil-soaked and paint-soaked materials, including paper and rags, from the Site daily, and more frequently as necessary, to eliminate danger of fire.
(e) Prohibit workers from smoking during operations involving combustible adhesives, solvents, mastics, or other fire hazard materials.

1.4.6 Remedy Damages. The Contractor shall promptly remedy damages and loss to property at the Site caused by the Contractor, by any Subcontractor, by anyone directly or indirectly employed by the Contractor or any such Subcontractor, or by anyone for whose acts the Contractor or any such Subcontractor may be liable. Should the Contractor cause damage to any Separate Contractor's work, the Contractor agrees, upon due notice, to settle with the Separate Contractor.

1.4.7 Written Programs. Contractor shall have written environmental, quality control, crisis/emergency management, health and safety programs in place with a designated (qualified) coordinator as the point of contact during the project. Such plans shall be on the Site and the superintendent and the project management team shall be familiar with and utilize such programs.

PART 5 – BONDS, INDEMNITY, AND INSURANCE

1.5.1 Bonds

1.5.1.1 Performance Bond and Payment Bond. The Contractor shall furnish both a performance bond and a payment bond in the exact form set forth in Section 7, (Forms) of these General Conditions.

1.5.1.2 Required Qualifications for Surety. The Contract provides that the surety and insurance companies must be acceptable to the Owner. Only those sureties listed in the Department of Treasury's Listing of Approved Sureties (Department Circular 570) are acceptable to the Owner. All bonds at the time of issuance must be issued by a company authorized by the Insurance Commissioner to transact the business of suretyship in the State of Georgia, and shall have a Best Policyholders Rating of "A-" or better and with a financial size rating of Class V or larger.

1.5.1.3 Penal Amount of Bonds, State Law. The Contractor acknowledges and agrees that, pursuant to O.C.G.A. §§13-10-2, 13-10-20, 13-10-40 and 13-10-60, the performance bond and the payment bond must be in a penal amount equal to at least 100% of the Contract Sum. Accordingly, the Contractor warrants and agrees that, for any Change Order increasing the Contract Sum by five percent or more or when the total cost of the work has increased by five percent or more, it shall obtain a written amendment to the payment bond and the performance bond increasing the penal amounts of both bonds to 100% of the Contract Sum, effective as of the date of the Change Order. The premium increase, if any, may be properly included in the cost of the Change Order. The Design Professional shall approve no payment for the work provided by the Change Order until the Contractor has provided the written amendment to the Owner.

1.5.2 Liability and Indemnification.

1.5.2.1 General Liability. The Contractor shall be responsible to the Owner from the time of the signing of the agreement or the beginning of the first work, whichever shall be earlier, for all injury or damage of any kind resulting from any negligent act or omission or breach, failure or other default regarding the Work by the Contractor, or any of its Subcontractors, its agents, employees or others working at the direction of the Contractor or on its behalf, regardless of who may be the owner of the property.

1.5.2.2 Indemnification Agreement. Contractor hereby agrees to indemnify and hold harmless the Owner, the State of Georgia and its departments, agencies and instrumentalities and all of their respective officers, members, employees and directors (hereinafter collectively referred to as the "Indemnitees") from and against any and all claims, demands, liabilities, losses, costs or expenses, including attorneys' fees, due to liability to a third party or parties, for any loss due to bodily injury (including death), personal injury, and property damage arising out of or resulting from the performance of this Contract or any act or omission on the part of the Contractor, its agents, employees or others working at the direction of Contractor or on its behalf., or due to any breach of this Contract by the Contractor, or due to the application or violation of any pertinent Federal, State or local law, rule or regulation. This indemnification extends to the successors and assigns of the Contractor. This indemnification obligation survives the termination of the Contract and the dissolution or, to the extent allowed by law, the bankruptcy of the Contractor. If and to the extent such damage or loss (including costs and expenses) as covered by this indemnification is paid by the State Tort Claims Trust Fund, the State Authority Liability Trust Fund, the State Employee Broad Form Liability Fund, the State Insurance and Hazard Reserve Fund, and other self-insured funds (all such funds hereinafter collectively referred to as the "Funds") established and maintained by the State of Georgia Department of Administrative Services Risk Management Division (hereinafter "DOAS") the Contractor agrees to reimburse the Funds for such monies paid out by the Funds.

1.5.2.2.1 This indemnification does not extend beyond the scope of this Contract and the work undertaken thereunder. Nor does this indemnification extend to claims for loses or injuries or damages incurred directly by the Indemnitees due to breach, negligence or default by the Indemnitor under the terms and conditions of this Contract.

1.5.2.2.2 This indemnification does not extend to claims for loses or injuries or damages incurred by the Indemnitees due to any negligent act, error, or omission of a design professional in the performance of professional services that fails to meet the applicable professional standard of care, skill and ability as employed by others in their profession.

1.5.2.3. DOAS. Risk Management will endeavor to notify affected insurers of claims made against the State that fall within this indemnity. In the event of litigation, the Attorney General will endeavor to keep the Contractor and its general liability insurer as named on the insurance certificate informed regarding the claims and settlement.

1.5.3 Insurance Requirements.

1.5.3.1 Insurance Certificates. The Contractor shall, in accordance with 2.1.2.2, procure the insurance coverages identified below at the Contractor's expense (e.g. within the bid price and Contract Sum) and shall furnish the Owner an insurance certificate listing the Owner as the certificate holder and as an additional insured. Evidence of insurance coverages shall be provided on the form shown in Section 7 or on a form acceptable to the Owner. The insurance certificate must provide the following:

(a) Name and address of authorized agent
(b) Name and address of insured
(c) Name of insurance company(ies)
(d) Description of policies
(e) Policy Number(s)
(f) Policy Period(s)
(g) Limits of liability
(h) Name and address of Owner as certificate holder
(i) Project Name and Number
(j) Signature of authorized agent
(k) Telephone number of authorized agent
(l) Mandatory thirty day notice of cancellation or non-renewal (except ten days for non payment).

1.5.3.2 Insurer Qualifications, Insurance Requirements. Each of the insurance coverages required below (i) shall be issued by a company licensed by the Insurance Commissioner to transact the business of insurance in the State of Georgia for the applicable line of insurance, and (ii) shall be an insurer (or, for qualified self-insureds or group self insureds, a specific excess insurer providing statutory limits) with a Best Policyholders Rating of "A-" or better and with a financial size rating of Class V or larger. Each such policy shall contain the following provisions:

1.5.3.2.1 The insurance company agrees that the policy shall not be canceled, changed, allowed to lapse or allowed to expire until thirty days after the Owner has received written notice thereof, as evidenced by return receipt of certified mail or statutory mail, or until such time as other insurance coverage providing protection equal to protection called for in this Contract shall have been received, accepted and acknowledged by the Owner. Such notice shall be valid only as to the Project as shall have been designated by Project Number and Name in said notice.

1.5.3.2.2 The policy shall not be subject to invalidation as to any insured by reason of any act or omission of another insured or any of its officers, employees, agents or other representatives ("Separation of Insureds").

1.5.3.2.3 Each Insurer is hereby notified that the statutory requirement that the Attorney General of Georgia shall represent and defend the Indemnities remains in full force and effect and is not waived by issuance of any policy of insurance. In the event of litigation, any settlement on behalf of the indemnities must be expressly approved by the Attorney General. The Contractor and its insurance carrier may retain, but are not obligated to retain, counsel to assist with the defense of the Indemnities, in which case there will be mutual cooperation between the Attorney General and such counsel. See O.C.G.A. § 45-15-12.

1.5.3.2.4 All deductibles shall be paid for by the Contractor.

1.5.3.2.5 Self-insured retention, except for qualified self-insurers or group self-insurers, in any policy shall not exceed $100,000.00.

1.5.3.3 Required Insurance Coverages. The Contractor also agrees to purchase insurance and have the authorized agent state on the insurance certificate that the Contractor has purchased the following types of insurance coverages, consistent with the policies and requirements of O.C.G.A. §50-21-37. The minimum required coverages and liability limits are as follows:

1.5.3.3.1 Workers' Compensation Insurance. The Contractor agrees to provide at a minimum Workers' Compensation coverage in accordance with the statutory limits as established by the General Assembly of the State of Georgia. A group insurer must submit a certificate of authority from the Insurance Commissioner approving the group insurance plan. A self-insurer must submit a certificate from the Georgia Board of Workers' Compensation stating the Contractor qualifies to pay its own workers' compensation claims. The Contractor shall require all Subcontractors performing work under this Contract to obtain an insurance certificate showing proof of Workers' Compensation Coverage and shall submit a certificate on the letterhead of the Contractor in the following language:

This is to certify that all subcontractors performing work on this Project are covered by their own workers' compensation insurance or are covered by the Contractor's workers' compensation insurance.

1.5.3.3.2 Employers' Liability Insurance. The Contractor shall also maintain Employer's Liability Insurance Coverage with limits of at least:

(i)	Bodily Injury by Accident	$1,000,000 each accident;
(ii)	Bodily Injury by Disease	$1,000,000 each employee; and
(iii)	Bodily Injury/Disease Aggregate	$1,000,000 each accident.

The Contractor shall require all Subcontractors performing work under this Contract to obtain an insurance certificate showing proof of Employers Liability Insurance Coverage and shall submit a certificate on the letterhead of the Contractor in the following language:

This is to certify that all subcontractors performing work on this Project are covered by their own Employers Liability Insurance Coverage or are covered by the Contractor's Employers Liability Insurance Coverage.

1.5.3.3.3 Commercial General Liability Insurance. The Contractor shall provide Commercial General Liability Insurance (2001 ISO Occurrence Form or equivalent) that shall include, but need not be limited to, coverage for bodily injury and property damage arising from premises and operations liability, products and completed operations liability, blasting and explosion, collapse of structures, underground damage, personal injury liability and contractual liability. The CGL policy must include separate aggregate limits per Project and shall provide at a minimum the following limits:

	Coverage	***Limit***
1.	Premises and Operations	$ 1,000,000.00 per Occurrence
2.	Products and Completed Operations	$ 1,000,000.00 per Occurrence
3.	Personal Injury	$ 1,000,000.00 per Occurrence
4.	Contractual	$ 1,000,000.00 per Occurrence
5.	General Aggregate	$ 2,000,000.00 per Project

Additional Requirements for Commercial General Liability Insurance are shown below at Paragraph 1.5.3.3.6.

1.5.3.3.4 Commercial Business Automobile Liability Insurance. The Contractor shall provide Commercial Business Automobile Liability Insurance that shall include coverage for bodily injury and property damage arising from the operation of any owned, non-owned, or hired automobile. The Commercial Business Automobile Liability Insurance Policy shall provide not less than $1,000,000 Combined Single Limits for each accident. Additional Requirements for Commercial Business Automobile Liability Insurance are shown below at Paragraph 1.5.3.3.6.

1.5.3.3.5 Commercial Umbrella Liability Insurance. The Contractor shall provide a Commercial Umbrella Liability Insurance to provide excess coverage above the Commercial General Liability, Commercial Business Automobile Liability and the Workers' Compensation and Employers' Liability to satisfy the minimum limits set forth herein. The umbrella coverage shall follow form with the Umbrella limits required as follows:

For Contract Amounts Less Than $5,000,000.00:	**For Contract Amounts Equal to or Greater than $5,000,000:**
$ 2,000,000 per Occurrence	$2,000,000 per Occurrence
$ 4,000,000 Aggregate	$10,000,000 Aggregate

Additional Requirements for Commercial Umbrella Liability Insurance are shown below at Paragraph 1.5.3.3.6.

1.5.3.3.6 Additional Requirements for Commercial Policies in Paragraphs 1.5.3.3.3 through 1.5.3.3.5

(a) The policy shall name as additional Insureds the officers, members, and employees of the Owner and the Using Agency.
(b) The policy must be on an "occurrence" basis.

1.5.3.3.7 Builders Risk Insurance. Contractor shall provide a Builder's Risk Policy to be made payable to the Owner and Contractor, as their interests may appear. The policy amount should be equal to 100% of the Contract Sum, written on a Builder's Risk "All Risk", or its equivalent. The policy shall be endorsed as follows:

The following may occur without diminishing, changing, altering or otherwise affecting the coverage and protection afforded the insured under this policy:

(i) Furniture and equipment may be delivered to the insured premises and installed in place ready for use; and
(ii) Partial or complete occupancy by Owner; and
(iii) Performance of work in connection with construction operations insured by the Owner, by agents or lessees or other Contractors of the Owner or Using Agency

In the event that the Contract is for renovation, addition or modification of an existing structure and Builders Risk Insurance is not available, the Owner will accept an Installation Floater Insurance Policy with the above endorsements in lieu of the Builders' Risk Insurance Policy. Such floater must insure loss to materials and equipment prior to acceptance by Owner and must be on an ALL RISK BASIS with the policy written on a specific job site.

1.5.3.3.8 Disposition of Insurance Documents. One original certificate of insurance with all endorsements attached must be deposited with Owner for each insurance policy required.

1.5.3.4 Termination of Obligation to Insure. Unless otherwise expressly provided to the contrary, the obligation to insure as provided herein shall not terminate until the Design Professional shall have executed the Certificate of Material Completion.

1.5.3.5 Failure of Insurers. The Contractor is responsible for any delay resulting from the failure of his insurance carriers to furnish proof of proper coverage in the prescribed form.

PART 6 – HAZARDOUS CONDITIONS AND MATERIALS

1.6.1 Hazardous Materials.

1.6.1.1 Definition.

1.6.1.1.1 The term "Hazardous Materials shall mean any material or substance within the meaning and definition for “Hazardous Substance” and/or “Hazardous Waste” as those terms are employed and set forth in the Georgia Hazardous Site Response Act and the Comprehensive Environmental Response Compensation and Liability Act as amended, 42 USC § 6901 et seq., and regulations promulgated thereunder (collectively "CERCLA") and any corresponding state or local law or regulation, and shall also include: (a) any Pollutant or Contaminant as those terms are defined in CERCLA; (b) any Solid Waste or Hazardous Constituent as those terms are defined by, or are otherwise identified by, the Resource Conservation and Recovery Act as amended, 42 USC § 6901 et seq., and regulations promulgated thereunder (collectively "RCRA") and any corresponding state or local law or regulation; (c) crude oil, petroleum and fractions of distillates thereof and petroleum releases ; (d) any other material, substance or chemical defined, characterized or regulated as toxic or hazardous under any applicable law, regulation, ordinance, directive or ruling, including, but not limited to, Asbestos or polychlorinated biphenyl (PCB),and, (e) any infectious or medical waste or environmental contamination as defined by any applicable federal or state laws or regulations.

1.6.1.1.2 The term “Hazardous” Materials does not include those materials that are expressly and specifically required to be installed under the Contract Documents.

1.6.1.1.3 The term “Hazardous” Materials does not include products or materials that are commonly used in construction or industrial practice so long as they are used in accordance with the manufacturer’s instructions or Material Safety Data Sheets issued for the product or materials. (*See* Article 1.6.3 below.)

1.6.1.2 Obligation to Notify Owner of Existing Hazardous Materials. The Contractor shall immediately notify the Owner and the Design Professional, both orally and in writing, of the presence and location of any physical evidence of, or information regarding the presence of Hazardous Materials at the Site of which it becomes aware. If the Contractor encounters Hazardous Materials on the Site the Contractor shall (i) immediately stop performance of Work or that portion of the Work affected by or affecting such Hazardous Materials; (ii) secure the contaminated area against intrusion; (iii) not disturb or remove the Hazardous Materials; (iv) not proceed, or allow any subcontractor or supplier to proceed, with any Work or other activities in the area affected by such Hazardous Materials until such materials have been properly remediated and until directed in writing to do so by the Owner; and, (v) take any other steps necessary to protect life and health and the surrounding environment. The Contractor shall be entitled to adjustment of the Contract Time and the Contract Sum pursuant to Section 5, Part 2 of these General Conditions in order to compensate for the impact of any required demolition, re-work, shutdown, delay, protection of work, disruption, and start-up resulting from the encountering of such Hazardous Materials on the Site for which the Contractor is not responsible.

1.6.1.3 Prohibition Against Selecting and Installing Products Containing Hazardous Materials. The Contractor shall not select, install or otherwise incorporate any products or materials containing Hazardous Materials within the boundaries of the Site. Should the Contractor or any Subcontractors have knowledge that, or believe that, an item, component, material, substance, or accessory within a product or assembly selected by the Contractor or any Subcontractor may contain Hazardous Materials it is the Contractor’s responsibility to secure a written certification from the manufacturer of any suspected material which identifies the specific Hazardous Material(s) contained, together with the Material Safety Data Sheets (MSDS) for such materials which shall be submitted to the Owner and Design Professional.

1.6.1.4 Fill, Backfill and Landscaping. No soil found on Site, or transported to the Site from remote locations, which contains debris or waste or Hazardous Materials shall be used for fill, backfill or landscaping topsoil.

1.6.2 Responsibility and Warranty of Subcontractors, Trade Contractors and Suppliers. Products that are specified by reference standards or in descriptive manner without a manufacturer’s name, model number or trade name, to be selected by the Contractor, shall not contain Hazardous Materials in any form, except as and to the extent permitted in 1.6.1, above, and 1.6.3, below. The Contractor shall require that each of its Subcontractors and Suppliers warrant to the Owner and Design Professional that all materials, products and assemblies, other than those which specifically and expressly required by the Contract Documents, incorporated, or submitted for incorporation into this Project, are free of Hazardous Materials. This warranty shall also include all materials, components, and accessories not specifically enumerated or detailed in the Contract Documents but which are required by performance specifications or recommended by manufacturers for complete installation of materials, products and assemblies.

1.6.3 Hazardous Materials and Substances Used On the Job Site. Products containing Hazardous Materials may be employed in the performance of work by the Contractor and its Subcontractors, as allowed by subparagraph 1.6.1.1.2 and 1.6.1.1.3 above, as a means and methods application or as part of its performance of the Work, such as chemicals used on the Site, but only provided that: (i) such products are used In accordance with the manufacturer's instructions and Material Safety Data Sheets; (ii) such products are rendered harmless upon completion of the affected Work; (iii) reasonable precautions can be and are taken to prevent foreseeable bodily injury or death to persons involved in the Work or in its proximity, including the ultimate users of the completed Work; (iv) the Contractor shall make available to the Owner and the Design Professional copies of Material Safety Data Sheets (MSDS) for any such products used on the Site, and (v), the Contractor shall immediately notify Owner, Design Professional and appropriate regulatory agencies if there is a spill or release or misuse of any such product used on the Site that exceeds State or Federal reportable limits.

1.6.4 Hazardous Conditions. The Contractor and Owner acknowledge that previously unknown hazardous conditions may be uncovered at any job site, and in particular where existing structures are being demolished and/or remodeled to accommodate new construction or to reutilize existing facilities. Should a hazardous condition not involving Hazardous Materials as set forth above be encountered on the Site, and should reasonable safety precautions be deemed by the Contractor in good faith to be inadequate to prevent foreseeable personal injury to persons encountering the hazardous condition, the Contractor shall, upon recognizing the hazardous condition, stop work in the affected area and immediately report the hazardous condition to the Design Professional and Owner in writing. The Owner shall undertake, or shall contract (by Change Order) with the Contractor or contract with a Separate Contractor, to resolve the condition. So long as the hazardous condition did not result from activities or substances brought on the Site by the Contractor, the Contractor is entitled to adjustments in the Contract Time and the Contract Sum as set forth in Paragraph 1.6.1.2 above.

PART 7 – MISCELLANEOUS PROVISIONS

1.7.1 Legal Compliance.

1.7.1.1 General. This Contract shall be governed by the law of Georgia. The Contractor shall comply with all laws, rules, regulations, ordinances, and orders of any government agency having jurisdiction in the performance of the Work and shall ensure the compliance of its Subcontractors.

1.7.1.2 Specific Laws. Without limiting the generality of the foregoing Paragraph, the following laws are specifically referenced:

1.7.1.2.1 The Drug-Free Workplace Act, O.C.G.A. *§* 50-24-1, *et seq.*

1.7.1.2.2 Preference for Georgia Supplies, materials, equipment, and agricultural products, O.C.G.A. §§50-5-60 through 61.

1.7.1.2.3 Preference for Georgia forest products, O.C.G.A. *§* 50-5-63.

1.7.1.2.4 Preference for local sellers of Georgia products, O.C.G.A. *§* 50-5-62.

1.7.1.2.5 Standards and Requirements for Construction, Alterations, etc., O.C.G.A. *§* 8-2-1 *et seq.*

1.7.1.2.6 Control of Soil Erosion and Sedimentation, O.C.G.A. *§* 12-7.1, *et seq.*

1.7.1.2.7 Regulation of Fire and other Hazards, O.C.G.A. *§* 25-2-1 *et seq.*

1.7.1.2.8 Regulation of Blasting Operations, O.C.G.A. *§* 25-2-1 *et seq.* and 25-9-1 *et seq.*

1.7.1.2.9 Providing safe workplace, O.C.G.A. §s 34-2-10 and 34-7-20

1.7.1.2.10 Georgia Facility Protection Act, O.C.G.A. *§* 25-9-1 *et seq.* (See Article E-12(f))

1.7.1.2.11 High Voltage Safety Act, O.C.G.A. *§* 46-3-30 *et seq.*

1.7.1.2.12 Access and Use by Physically Handicapped Persons, O.C.G.A. *§* 30-3-1 *et seq.*

1.7.1.2.13 Small and Minority Business Enterprises, O.C.G.A. §s 50-5-120 *et seq.* and 50-5-130 *et seq.*

1.7.1.2.14 Trading with the State or State Officials, O.C.G.A. §s 45-10-20 to 45-10-71.

1.7.1.2.15 Title VII of the Civil Rights Act, 42 U.S.C. *§* 2000a through 2000h-6

1.7.1.2.16 Age Discrimination in Employment Act, 29 U.S.C. *§* 621 *et seq.*; 42 U.S.C. *§* 6101 *et seq.*

1.7.1.2.17 Americans with Disabilities Act, 42 U.S.C. *§* 12101 *et seq.*

1.7.1.2.18 Federal Occupational Safety and Health Act, 29 U. S. C. *§* 651 *et seq.*

1.7.1.2.19 Federal Emergency Planning and Community Right-to-Know Act, 42 U. S. C. *§* 11001 *et seq.*

1.7.1.2.20 Georgia Open Records Act, O.C.G.A. §50-18-70 *et seq.*

1.7.1.2.21 Georgia Blasting Standards Act, O.C.G.A. *§* 25-8-1 *et seq.* and Blasting, Excavating Nearby Underground Gas Pipes and Utilities, 25-9-1 *et. seq.*

1.7.1.2.22 Scaffolding and Staging Statute, O.C.G.A. §34-1-1 *et seq.*

1.7.1.2.23 Department of Labor Rules and Regulations, O.C.G.A. *§* 34-2-6 *et seq.*

1.7.1.2.24 Hazardous Chemical Protection and Right to Know Act, O.C.G.A. *§* 45-22-2 *et seq.*,

1.7.1.2.25 Retainage on Public Works Contracts, 0.C.G.A. §13-10-80 *et seq.*

1.7.1.2.26 Compliance with "federal work authorization programs" and federal Immigration Reform and Control Act of 1986 by Georgia Public Employers, contractors and subcontractors, O.C.G.A. §13-10-90 *et seq.*

1.7.1.3 Building Codes. The following Building Codes, in the latest editions approved by the Georgia Department of Community Affairs, shall be used. (*See* O.C.G.A. §8-2-20.) The Design Professional will designate any additional codes or special modifications in the Supplementary General Conditions. As of the year 2000, these codes are published jointly by the Southern Building Code Congress International, the International Code Council, the Building Officials and Code Administrators, International, and the International Conference of Building Officials, and are commonly referred to as the International Building Codes.

1.7.1.3.1 Georgia State Minimum Standard Building Code (International Building Code, 2000 Edition) with Georgia Amendments.

1.7.1.3.2 Georgia State Minimum Standard Mechanical Code (International Mechanical Code, 2000 Edition), with Georgia Amendments.

1.7.1.3.3 Georgia State Minimum Standard Gas Code (International Fuel Gas Code, 2000 Edition), with Georgia Amendments.

1.7.1.3.4 Georgia State Minimum Standard Plumbing Code (International Plumbing Code, 2000 Edition), with Georgia Amendments.

1.7.1.3.5 Georgia State Minimum Standard Electric Code (National Electrical Code, 2002 Edition), with Georgia Amendments.

1.7.1.3.6 Georgia State Minimum Standard Energy Code (International Energy Conservation Code, 2000 Edition), with Georgia Amendments.

1.7.1.3.7 Georgia State Minimum Standard Fire Prevention Code (International Fire Code, 2003 Edition), with Georgia Amendments.

1.7.1.4 Fire, Life Safety, and Accessibility Codes. The following codes, in the versions approved by the Georgia State Fire Marshal/Fire Safety Commissioner and Department of Human Resources, shall be used. The Design Professional will designate any additional codes or special modifications in the Supplementary General Conditions.

1.7.1.4.1 Georgia State Life Safety Code (NFPA 101)

1.7.1.4.2 State Accessibility Codes (See O.C.G.A. §30-3-3)

1.7.1.4.3 Rules and Regulations of the Georgia Safety Fire Commissioner (See O.C.G.A. §§25-2-4,12.)

1.7.1.4.4 Swimming Pool Permits and Regulations (*See* O.C.G.A. §31-45-3, Rules and Regulations Chapter 290-5-57)

1.7.1.5 Latest Edition. The latest edition approved by the implementing agency of the regulations, rules, and codes listed in Paragraphs 1.7.1.3 and 1.7.1.4 above, with all amendments as of the date of the opening of bids, shall govern the installation of all Work and is adopted and incorporated into the Contract Documents and made a part thereof by reference, Provided, however that the drawings and specifications shall be adhered to in all cases where they call for quality of materials, quality of workmanship, or quality of construction which is equal to or in excess of the quality required by the above stated codes and Provided also: That there may be no variances from the drawings and specifications except to the extent that the said variances shall be necessary in order to comply with the above stated codes. It shall be the responsibility of the Contractor to familiarize himself with the requirements of the above stated codes. If there are any express requirements in the drawings or specifications that are at variance to the above stated codes, all changes in the Work necessary to eliminate or add to the said requirements and make the Work conform to the above stated codes shall be adjusted as provided in the Contract for changes in the Work.

1.7.1.6 Compliance with Executive Orders Concerning Ethics. The Contractor warrants that he and his firm have complied in all respects with the Governor's Executive Orders concerning ethics matters, including, but not limited to, Executive Order dated January 13, 2003 (establishing Code of Ethics for Executive Branch Officers and Employees, including provisions governing former officers and employees); Executive Order dated October 1, 2003 (governing vendors to state agencies and disclosure and registration of lobbyists); and O.C.G.A. Sections 21-5-70(5), 21-5-71 and 21-5-73, all as amended effective January 9, 2006 (requiring registration and disclosure filings by state agency vendor lobbyists). In this regard, the Contractor certifies that any lobbyist employed or retained by the Contractor or his firm has both registered and made the required disclosures required by the Executive Orders, as amended.

1.7.1.7 Compliance with Federal and State Work Authorization and Immigration Laws. The Contractor and all subcontractors, suppliers and consultants must comply with all federal and state work authorization and immigration laws, and must certify compliance using the form set forth in Section 7 ("Georgia Security and Immigration Compliance Act Affidavits"). The required certificates must be filed with the Owner and copied maintained by the Contractor as of the beginning date of this contract and each subcontract, supplier contract, or consultant contract, and upon final payment to the subcontractor or consultant. State officials, including officials of the Georgia Department of Audits and Accounts, officials of the Owner, retain the right to inspect and audit the Project Site and employment records of the Contractor, subcontractors and consultants without notice during normal working hours until Final Completion, and as otherwise specified by law and by Rules and Regulations of the Georgia Department of Audits and Accounts.

1.7.2 Surveys, Permits, and Regulations. The Owner shall furnish all surveys unless otherwise specified. Permits and licenses of a temporary nature necessary for the prosecution of the Work shall be obtained and paid for by the Contractor. Permits, licenses, and easements for permanent structures or permanent changes in existing facilities shall be obtained and paid for by the Owner unless otherwise specified. The Contractor and its Subcontractors must pay any municipal or county occupational licenses, taxes, or fees, if any. The Contractor shall give all notices and comply with all laws, ordinances, rules, and regulations bearing on the conduct of the Work. If the Contractor observes that the drawings or specifications are at variance with any such laws, ordinances, rules or regulations, he shall promptly notify the Owner in writing, and any necessary changes shall be adjusted as provided in the Contract for changes in the Work. If the Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules or regulations without such notice to the Owner, he shall bear all costs arising therefrom. Nothing in this paragraph shall be construed to impose design responsibility on the Contractor except as noted in the Contract Documents.

1.7.3 Open Records Act. Owner and Design Professional and Contractor acknowledge and agree that all records of the project and the Work, including records of Subcontractors, are subject to the Georgia Open Records Act, O.C.G.A. §50-18-70 et seq., with particular attention being called to O.C.G.A. §50-18-70(a) regarding the records of private persons, firms, corporations, or other private entity engaged in performance of services or functions on behalf of a state agency, public agency or public office.

1.7.4 Use of Site. The Contractor has a revocable license to come on, use, and perform Work upon the Premises, shall confine thereto his plant, his apparatus, the staging and storage of materials, the operations of his forces and the Work to limits indicated by law, ordinances, permits, or the Contract Documents, and shall not unreasonably encumber the Premises with his materials. The Contractor shall not load or permit any part of the Work to be loaded with weight that will endanger its safety. The Contractor shall enforce Contract requirements regarding signs, advertisements, fires, and smoking and shall remove from the Premises and properly dispose all trash and debris.

1.7.5 Office for Contract Compliance Specialist (CCS). The Contractor shall provide at his expense a temporary office, services, utilities, equipment, and supplies at the Site for the use of the CCS. The office shall be a minimum of 100 square feet in size; weather-tight; and shall be provided with heat, ventilation, cooling, electric lights, adequate windows, and securable access. The following services shall be provided: at least four dual-plug 110 v. electrical outlets, two private telephone connections and local telephone service. The following equipment for the CCS's exclusive use shall be provided: a desk with drawers, two chairs, a four drawer metal file cabinet, a plan table and rack, a telephone with messaging capability, and connection, cables/electrical surge protection for the electronic equipment and for the CCS's computer. The following items, which may be used in common with the Contractor's facilities, shall be provided: wet (flush) toilet, potable water and soap for hand washing, potable water suitable for drinking, access to fax machine and copier, and use of a room with table and chairs to accommodate meetings of a minimum of eight (8) people. The use of a temporary portable wet toilet with a holding tank is acceptable only when a sanitary sewer is not available on the Site. Toilet tissue and paper hand towels shall be provided at all times. At the completion of the project, all of the equipment provided will be returned to the Contractor. The Contractor is not responsible for providing the following items for the CCS: computer equipment, internet access, long distance, stationery supplies, and personal safety equipment.

1.7.6 Utilities. Pending the extension and connection of permanent water, permanent gas, permanent sewer taps, and permanent electric power, the Contractor shall obtain temporary water, temporary gas, temporary electric power, and provide

sewage disposal at his own expense. In the absence of provisions to the contrary, the Contractor shall pay for all utilities services until Material Completion has been achieved.

1.7.7 Royalties and Patents. The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof. The Owner shall defend and be responsible for all such loss when a particular process or the product of a particular manufacturer or manufacturers is specified.

1.7.8 Separate Contracts. The Owner reserves the right at any time and from time to time upon notice to Contractor to perform, or cause to be performed by other Contractors, other work at the Site in connection with the development of the Project that is not contemplated hereby or that is contemplated hereby if the Contractor and the Owner shall be unable to agree upon a Change Order incorporating such work as Work of the Contractor under this Contract. In either case, the Owner shall assure that such personnel or Contractors do not cause any conflict with the Work of Contractor. Contractor shall afford the Owner and other Contractors reasonable opportunity for the introduction, protection, and storage of material and equipment at the Site and the execution of work, and shall properly connect, if required by Contract Documents, and coordinate its work with theirs. If any work by the Owner or its other Contractors increases Contractor's costs or extends the time of performance, Contractor shall be entitled upon timely claim to a Change Order for payment by Owner of any reasonable costs actually incurred by Contractor as a result thereof and to an extension of time for performance for such reasonable time as the Design Professional shall determine. Contractor has no responsibility hereunder to certify the suitability or correctness of any work performed by Owner's own personnel or other Contractors under direct contract with the Owner. This Article also applies to installation of loose equipment and fixtures by the Owner, Using Agency, or a Separate Contractor.

1.7.9 Women, and Disadvantaged Business Participation.

1.7.9.1 Good Faith Efforts. Contractor shall, to the extent consistent with quality, price, risk and other lawful and relevant considerations, use its good faith efforts to achieve participation by minority, women, and disadvantaged business enterprise participation in Work and services contracted to Contractor under this Contract.

1.7.9.2 Policy of the State of Georgia. It is the policy of the State of Georgia that minority business enterprises shall have the maximum opportunity to participate in the State purchasing process. Therefore, the State of Georgia encourages all minority business enterprises to compete for, win, and receive Contracts for goods, services, and construction. In addition, the State encourages all companies to sub-contract portions of any State Contract to minority business enterprises. It is the wish of the Owner that minority businesses be given the opportunity to propose on the various parts of the Work. This desire on the part of the Owner is not intended to restrict or limit competitive selection or to increase the cost of the Work. The Owner supports a healthy free market system that seeks to include responsible businesses and provides ample opportunity for business growth and development.

1.7.9.3 Minority Vendor Designee. The minority vendor designee of the Owner shall be specified in the Supplementary General Conditions or the Instructions to Bidders. For more information, please contact the Board of Regents' Office of Business Development by e-mail at BusinessDevelopment@usg.edu.

1.7.10 Assignment. The Contractor shall not assign the Contract or sublet it as a whole nor shall the Contractor assign any moneys due or to become due to him hereunder. Contractors may subcontract portions of the Work, normally performed by Subcontractors.

1.7.11 Interpretation of Contract Documents. The Contract Documents shall be construed neither against nor in favor of either party, but shall be construed in a neutral manner.

1.7.12 Counterparts. This Contract may be executed in multiple counterparts. All counterparts shall constitute one and the same instrument. One (1) counterpart of this Contract shall be delivered to the Owner and one (1) counterpart to the Contractor.

1.7.13 Forms and Specimens. The forms and specimens In Section 7 are incorporated by reference herein and shall be executed in substantial conformance as required or convenient in describing obligations under the Contract Documents.

1.7.14 Entire Agreement. The Contract Documents referenced herein constitute the entire Contract between the Owner and the Contractor with respect to the Project and supersedes all prior negotiations, representations, and agreements. Except as set forth herein, there are no other promises, understandings, agreements, representations or warranties, oral or written, expressed or implied between the parties. This Contract may not be changed, modified, or terminated, in whole or in part, nor any provision waived except by Change Order.

SECTION 2 – PRE-COMMENCEMENT PHASE

PART 1 – PRE-COMMENCEMENT PHASE SERVICES

2.1.1 Pre-commencement Coordination. As early as practicable and reasonably in advance of the commencement of Work on the Project, the Contractor shall schedule and conduct an initial construction coordination meeting for the purpose of determining and developing the appropriate and necessary processes and procedures for proper planning and coordination for the installation of all the Work. The meeting shall include all of the Subcontractors, Trade Contractors, , and Suppliers materially involved in such installation of the Work. The Contractor shall assure that each necessary Subcontractor involved in performance of the Work shall be present and represented by a knowledgeable person with authority to reach agreement on the coordination procedures and processes involving its portion of the Work. The Owner shall be represented at this initial meeting by the Owner's Representative, and shall require that authorized and knowledgeable representatives of each of the separate disciplines in the design team, comprising the Design Professional and all Consultants contributing to the design preparation, shall also be present at the initial meeting. If necessary, additional meetings shall be scheduled by the Contractor with all of the affected parties to continue review and resolution of any real or apparent conflicts or interferences.

2.1.2 Construction Preparation Period.

2.1.2.1 Requirement for Project Planning. No physical work will begin on the construction site until the receipt of a Proceed Order issued by the Owner. The Contract assumes that a Proceed Order will be issued in not more than sixty days from the Effective Date of the Contract. Failure of the Contractor to provide the necessary documentation for the issuance of a Proceed Order shall not entitle the Contractor to any extension of time. If a Proceed Order is not issued within sixty days from the award of the Contract and non-issuance is due to nonperformance by the Contractor, the Contractor may be in default.

2.1.2.2 Timing of Submission of Documents. No Proceed Order shall be issued until the Owner has received, in good and proper order, the following documents. The documents shall be submitted in accordance with the following schedule:

2.1.2.2.1 Within ten days of the Notice of Apparent Successful Bid:

(a) Contract executed by Contractor
(b) Payment and Performance Bonds in accordance with Article 1.5.1

2.1.2.2.2 Within fourteen days of the Effective Date of the Contract:

(a) Proof of Insurance as required in Paragraph 1.5.3.1
(b) List of intended Subcontractors

2.1.2.2.3 Prior to the issuance of the Proceed Order, but in any event, within sixty days of the Effective Date of the Contract:

(a) Submittal and Shop Drawing Schedule as required in Article 2.2.3
(b) Construction Progress Schedule as required in Article 2.1.5
(c) Documents Review Report as required in paragraph 2.1.2.3
(d) Construction Management Plan as required in Article 2.1.3
(e) Documentation necessary for receiving land disturbance permits, See Article 2.2.5
(f) Contractor's Quality Control Program as required in Article 2.1.4
(g) Written Safety Program as required in Article 1.4.7
(h) Contractor's Schedule of Rental Rates and Wage Rates

2.1.2.3 Document Review and Verification. Within one business day of receipt of the Effective Date of the Contract Contractor shall commence a review of the plans and Specifications, to identify conflicts, omissions, or constructability issues in the documents. Contractor shall prepare a report containing a list of issues and suggested modifications identified. He shall provide a copy of the report to the Design Professional and the Owner prior to the end of the Construction Preparation Period. If a fire protection sprinkler system is required, the Contractor shall submit to the Design Professional the certificate of competency of the fire protection sprinkler system Trade Contractor as required by State of Georgia Fire Protection and Safety Code. The certificate of competency shall be provided to the Design Professional prior to any work being performed on the fire protection sprinkler system. Nothing in this paragraph shall be construed to impose design responsibility on the Contractor except as noted in the Contract Documents.

2.1.3 Construction Management Plan. Contractor shall prepare and furnish to the Owner a thorough and complete plan for the management of the Project from issuance of the Proceed Order through the issuance of the Design Professional's Certificate of Material Completion. Such plan shall include, without limitation, an estimate of the manpower requirements for each trade and the anticipated availability of such manpower, a schedule prepared using the critical path method that will amplify and support the schedule required in Article 2.1.5 below, and the Submittal Schedule as required in Article 2.2.3. The Contractor shall include in his plan the names and resumés of the Project Superintendent, Project Manager and the person in charge of Safety.

2.1.4 Quality Control Program.

2.1.4.1 Responsibility for Quality of Materials and Installation. Contractor acknowledges that he has full, total, and complete responsibility for providing materials, labor, and all other items necessary for providing the level of quality specified in the Contract Documents. He agrees that this responsibility is indivisible, non-delegable, non-transferable, and not diminished by any inspections provided by the Design Professional or his consulting engineers, nor by any inspections provided by the Owner. In recognition of this, Contractor will prepare for submission and review by the Design Professional, a written program describing the efforts that will be taken to insure the proper quality level is achieved. The program shall be submitted prior to the issuance of a Proceed Order.

2.1.4.2 Written Program. Contractor's written Quality Control Program shall describe in detail the steps the Contractor will take to ensure quality and will include, without limitation, those personnel, in addition to the Superintendent, who will provide review and verification of the proper installation of the Work. Each Subcontractor having responsibility for more than $100,000 of the contract cost shall be addressed in the plan. The written program shall include affidavits from each of the involved Subcontractors acknowledging their responsibilities under the Contract in general and the Quality Control Program specifically.

2.1.5 Construction Progress Schedule; Overall Project Schedule. The Contractor shall submit for review by the Design Professional and approval by the Owner a Construction Progress Schedule based upon the Design Professional's Preliminary Design and Construction Schedule and prepared using a CPM (Critical Path Method) process within sixty days after the Effective Date of the Contract, utilizing a full-featured software package in a form satisfactory to the Design Professional and Owner, showing the dates for commencement and completion of the Work required by the Contract Documents, including coordination of mechanical, plumbing, and electrical disciplines, as well as coordination of the various subdivisions of the Work within the Contract. Milestones must be clearly indicated and sequentially organized to identify the critical path of the Project. The Construction Schedule will be developed to represent the CSI specification divisions. It shall have the minimum number of activities required to adequately represent to the Owner the complete scope of Work and define the Project's (and each Phase's if phased) critical path and associated activities. The format of the Construction Progress Schedule will have dependencies indicated on a monthly grid identifying milestone dates such as construction start, phase construction, structural top out, dry-in, rough-in completion, metal stud and drywall completion, equipment installation, systems operational, inspections for Material Completion and Occupancy Date, and Final Completion Date. The Contractor shall submit, along with the Construction Progress Schedule, the Submittal Schedule for approval by the Design Professional, correlating the associated approval dates for the documents with the Construction Progress Schedule. Upon recommendation by the Design Professional and approval by the Owner, the Construction Progress Schedule shall become the Overall Project Schedule, which shall be utilized by the Design Professional, Owner and Contractor. The Contractor must provide the Design Professional and the Owner with monthly updates of the Overall Project Schedule indicating completed activities and any changes in sequencing or activity durations, including approved change orders. *See also* Article 3.3.5.

2.1.6 Progress Reports and Information. When required, the Contractor shall submit to the Owner such schedule of quantities and costs, payrolls, bills, vouchers, correct copies of all subcontracts, statements, reports, correct copies of all agreements, correspondence, and written transactions with the surety on the performance bond that have any relevance to the Work, estimates, records, and other data as the Owner may request that concerns the Work performed or to be performed under this Contract. When requested by the Owner, the Contractor shall give the Owner access to its records relating to the foregoing. (*See also* Article 1.2.3, Audits.) The above reports shall include, but are not limited to, (a) written notice of dates by which specified Work will have been completed, (b) written notice of dates by which Non-Compliant Work will be made good, (c) written notice that Non-Compliant Work has been made good, (d) written notice as to the date or dates by which Work that has not been performed with equal steps and at the same rate required by the Overall Project Schedule shall have been brought into conformity with the Overall Project Schedule, (e) date by which any undisputed claim of a Subcontractor supplier, or laborer shall have been paid, (f) written advice regarding the nature and amount of any disputed claim of a Subcontractor, supplier, or laborer, and (g) information regarding Work performed under Change Orders.

2.1.7 Rental Rates and Wage Rates for Change Orders. As soon as is practical, but prior to the completion of the Construction Preparation Period and in any event prior to the commencement of any Work on the Site, the Contractor shall submit in accordance with the style and format of a specimen to be furnished by the Owner for consideration of the Owner the following: (1) a proposal for rental rates on heavy construction equipment that shall apply in the event Change Order Work is performed, and (2) a proposal for wage rates for the types of project labor that shall apply in the event of the execution of any Change Order Work. Under penalty of false swearing, a principal of the contracting firm shall certify that the proposal for rental rates and proposal for wage rates do not exceed current costs for like services. The Owner will in no event consider a rental rate in excess of eighty percent of the rate set forth in the latest edition of the "Compilation of Nationally Averaged Rental Rates for Construction Equipment" of the Associated Equipment Distributors unless the rates proposed in excess of eighty percent are supported by proof satisfactory to the Owner that the excess rates are reasonable. If the equipment is owned by the Contractor the costs shall be charged at a maximum of eighty percent of market monthly rental rates for the amount of time used. If applicable, transportation costs may be included. The decision of the Owner shall be final, binding and conclusive on all parties. Rental rates shall be payable only for the actual time the equipment is required on the Site.

2.1.8 Unit Prices.

2.1.8.1 During Construction Preparation Period. Prior to the completion of the Construction Preparation Period, the Contractor shall establish with the Owner Unit Prices not already bid. Examples include additional installation of stormwater management BMPs, any other anticipated Change Order Work that can utilize Unit Prices, or for any items of Work considered necessary by the Design Professional and not established in the Contract Documents.

2.1.8.2 During Construction. Upon request of the Owner the Contractor shall submit written proposals for unit prices to be applied in the event Change Order Work is authorized by the Owner to be performed under Case (b).

2.1.8.3 Calculation of Unit Prices. Unit Prices include all sums for payment, repayment, reimbursement, remittance, remuneration, compensation, profit, cost, overhead, expense, loss, expenditure, allowance, charge, demand, hire, wages, salary, tax, cash, assessment, price, money, bill, statement, dues, recovery, restitution, benefit, recoupment, exaction, or injury. Unit prices to cover the addition or reinstallation of stormwater management BMPs shall be calculated by type and linear foot. Unit Prices *shall not* include any Time Dependent Overhead Costs, as such costs will be added as appropriate pursuant to Section 3, Part 3. The Contractor shall certify that the Unit Prices submitted do not exceed current costs in the industry or trade for like services or materials.

2.1.9 Building Commissioning Services. The Owner may provide as a part of its testing services the Building Commissioning services involving the project's HVAC and exhaust systems, temperature control systems, fire detection and alarm systems, emergency power and lighting system, fire suppression system, security locks and security locking control systems, food service equipment (if applicable), and laundry equipment (if applicable). In the event the Using Agency's Program specifies additional commissioning services, the Owner shall procure such services as well. The Owner, through its Executive Administrator, may engage an independent Commissioning Authority. It is the intent of this Article that the Commissioning Authority enforce the requirements mentioned herein and certify that the systems and equipment listed all function properly prior to the initiation of each final inspection.

2.1.9.1 Initial Building Commissioning Plan. The Owner may develop with its Commissioning Authority, the Contractor and the Design Professional, an initial Building Commissioning plan to consist of the following:

2.1.9.1.1 The Building Commissioning Plan shall include a summary of understanding of the design intent for each of the relevant building systems and equipment. Each design intent summary shall establish critical performance criteria that indicates whether a system is properly functioning.

2.1.9.1.2 The Building Commissioning Plan shall include a commissioning schedule listing the duration of each commissioning activity such as system and equipment manual submittal and approval, equipment start-up, and system and equipment training, and combining all such activities in a manner reflecting the inherent subsidiary relationships between activities. This schedule shall be used as a basis for accomplishing the commissioning portion of the Overall Progress Schedule.

2.1.9.2 Define Duties. The Contractor, in coordination with the Commissioning Authority and the Design Professional, shall during preparation of the Contract Documents clearly define all duties and activities required of the various Trade Contractors relating to Building Commissioning, any necessary order in which these activities and duties must take place, and define all critical performance criteria to be achieved.

2.1.9.3 Inspect, Review and Monitor. The Commissioning Authority shall inspect, review and monitor all Building Commissioning related construction activities for timeliness, completeness and conformance with the criteria established by the contract documents, and report same to the Contractor, Owner and the Design Professional. The Contractor and Commissioning Authority shall coordinate and supervise the training activities of each system.

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PART 2 – CONTRACT DOCUMENTS AND SITE PLAN

2.2.1 Contract Documents.

2.2.1.1 Familiarity with Contract Documents. Contractor represents that it has reviewed or will review and become familiar with the Contract Documents, not later than the commencement of the construction phase.

2.2.1.2 Identification of Construction Documents. The Design Professional shall identify the Construction Documents, which shall include, but are not limited to, the Specifications, the Drawings, and all Addenda. The Construction Documents are included within the Contract Documents.

2.2.1.3 Correlation and Intent. It is the intention of the Owner, Design Professional, and Contractor that the Construction Documents include all items necessary for proper execution and full and final completion of the Work. The Contract and Construction Documents (the Contract Documents) are complementary, and what is required by one is as binding as if required by all. Performance by the Contractor is required to the extent consistent with and reasonably inferable from the Contract Documents as being necessary to produce the design intent as expressed in the Contract Documents. The intention of the Owner and the Design Professional is that the Contract and Construction Documents include all labor and materials, equipment, and transportation necessary for the proper execution of the work. It is not intended, however, that materials or work not covered by or properly inferable from any heading, branch, class, or trade of the specifications shall be supplied unless noted on the drawings.

2.2.1.4 Arrangement. of Specifications. The Specifications are separated into numbered and titled divisions for convenience of reference. Neither the Owner nor the Design Professional shall assume any responsibility for defining the limits of any subcontracts on account of the arrangement of the Specifications. Notwithstanding the appearance of such language in the various divisions of the Specifications as, "The Plumbing Contractor," "The Electrical Contractor," "The Roofing Contractor," etc., the Contractor is responsible to the Owner for the entire Contract and the execution of all of the Work referred to in the Contract Documents. No partial sets of Bidding Documents shall be issued by the Design Professional. Any partial documents issued by the Contractor shall be the responsibility of the Contractor.

2.2.1.5 Conflicts. The following general principles shall govern the settlement of disputes that may arise over conflicts in the Contract Documents: (a) as between figures given on drawings and the scaled measurements, the figures shall govern; (b) as between large-scale drawings and small-scale drawings, the larger scale shall govern; (c) as between the Contract and the Specifications, the requirements of the Contract, as executed, shall govern. Conflicts noted shall be reported to the Design Professional. The principles set forth herein shall not alter the provisions of Paragraph 1.1.7.1. Schedules, lists, indexes, tables, inventories, written instructions, written descriptions, summaries, statements, classifications, Specifications, written selections, or written designations, although appearing on the drawings, are deemed to be and are Specifications.

2.2.1.6 Requests for Information (RFI). In the event the Contract Documents are not complete, definite, and clear, the Contractor shall request the Design Professional in writing for additional instructions and shall furnish the Owner a copy of the RFI. With reasonable promptness but not more than five days thereafter, the Design Professional shall furnish complete, definite, and clear instructions in writing, or by means of drawings, or both. In the event such additional instructions are given orally for expediency, they shall be confirmed in writing or by drawings or both within five days following the oral instructions. Any such additional instructions shall be consistent with the Contract Documents and reasonably inferable therefrom. The Work shall be executed in conformity with the aforesaid instructions. The Design Professional shall furnish the Owner a copy of all additional instructions issued to the Contractor. If, because of events beyond its reasonable control, the Design Professional is not able to meet the specified time period, then it is entitled to ask for additional time from the Owner.

2.2.1.7 Effect of Addenda, Bulletins, and Change Orders. No special implication, interpretation, construction, connotation, denotation, import, or meaning shall be assigned to any provision of the Contract Documents because of changes created by the issuance of any (1) Addendum, (2) Bulletin, or (3) Change Order other than the precise meaning that the Contract Documents would have had if the provision thus created had read originally as it reads subsequent to the (1) Addendum, (2) Bulletin, or (3) Change Order by which it was created.

2.2.1.8 Intellectual Property Rights in Construction Documents, Drawings, and Models. The drawings, Specifications and other documents prepared by the Design Professional pursuant to this Contract (including, without limitation, the Construction Documents), are the property of the Owner, whether or not the Project for which they are made commences or completes construction. Neither the Contractor nor any Subcontractor or material or equipment supplier shall own or claim a copyright in such drawings, Specifications, and other similar or related documents; Owner shall retain all common law, statutory, and other intellectual property rights with respect thereto. The Contractor must deliver remaining copies of such documents to the Owner upon request or upon completion of the Work, except that the Contractor may keep one copy of such documents for its files. The Contractor shall only use such drawings, Specifications and other documents for this Project. Neither the Contractor nor any Subcontractor or material or equipment supplier may use such drawings, Specifications, and other documents on other projects without the specific written consent of the Owner. All models are the property of the Owner.

2.2.2 Documents at the Project Site.

2.2.2.1 Drawings and Specifications at the Project Site. The Contractor shall keep at the Site at least one copy of the Contract Documents and Change Orders, all in good order and available to the Design Professional and to his representatives.

2.2.2.2 Recording Changes. The Contractor shall record all changes and shall annotate a copy of the drawings to reflect the as-built condition as required in Paragraph 1.1.7.3 above.

2.2.3 Submittals. Submittals required by the Contract Documents shall be prepared specifically for the Work by the Contractor to illustrate some portion of the Work. Submittals are not Contract Documents.

2.2.3.1 Submittal Schedule. Within sixty days after the Effective Date of the Contract, the Contractor shall prepare and submit a Submittal Schedule for review and approval of the Design Professional. In establishing the Submittal Schedule the Contractor shall take into account large submittal documents that will require longer review times, e.g., submittals with over fifty sheets of drawings. The Design Professional's approval shall be based on conformance of the Submittal Schedule with the Overall Project Schedule, subject to change from time to time in accordance with the progress of the Work.

2.2.3.2 Submission and Approval. The Contractor's Submittals must comply with the Contract Documents. The Contractor shall review and approve all Submittals prior to submission. The Contract Documents shall specify when shop drawings or submittals require the seal of a specialty consultant. The Contractor shall submit copies of Submittals as required by the Contract Documents for the Work of the various trades. The Design Professional shall review, approve, or take other appropriate action with respect to shop drawings, samples, or other submissions of the Contractor, including, but not limited to, confirming conformance with the design concept of the Project and with the Contract Documents. The Design Professional shall respond to and return said items to the Contractor within fourteen calendar days from receipt provided that the Submittals are submitted by the Contractor in accordance with the required Submittal schedule. The Design Professional shall review and give comment or approval to Submittal schedule within fourteen calendar days from receipt. Large submittal documents may require longer review times, e.g., submittals with over fifty sheets of drawings. If, because of events beyond its reasonable control, the Design Professional is not able to meet the specified time period, then it is entitled to ask for additional time from the Owner. The Contractor shall make all corrections required by the Design Professional and furnish such corrected copies as may be needed. If the Contractor believes that any corrections required by the Design Professional constitute a change to the contract, the Contractor shall immediately notify the Design Professional and Owner and request instructions. By forwarding the approved Submittals to the Design Professional, the Contractor represents that the Contractor has determined and verified materials, field measurements, and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such Submittals with the requirements of the Work and of the Contract Documents. The Design Professional's approval of Submittals shall not relieve the Contractor from the responsibility for errors of any sort in Submittals or schedules. The Contractor shall perform no portion of the Work for which the Contract Documents require Submittals until the Design Professional has approved the respective Submittal. The Contractor shall maintain at the Site one copy of all approved Submittals.

2.2.3.3 Cost of Additional Review. The Design Professional shall be responsible for an initial and one subsequent review of the Submittal. Where the subsequent Submittal is not accepted due to noncompliance with the Contract Documents, the Contractor shall be responsible for payment for the additional time required by the Design Professional to complete the Submittal review.

2.2.4 Manufacturer's Recommendations. All work or materials shall be installed in accordance with the manufacturer's recommendations and requirements. The Contractor shall obtain the manufacturer's recommendations and requirements, for its use at the Site in executing the Work, copies of bulletins, circulars, catalogues, or other publications bearing the manufacturer's titles, numbers, editions, dates, etc. If the manufacturer's recommendations and requirements are not available, the Contractor shall request installation instructions from the Design Professional.

2.2.5 Site Plan.

2.2.5.1 General. The Design Professional is responsible for providing the initial sealed Site Plan as a part of the Bidding Documents. During the Pre-Commencement phase, the Contractor shall review the initial Site Plan and make and submit recommendations for any changes to the initial Site Plan. The Contractor is required to obtain the land disturbance permit(s) applicable to the Owner that implement the National Pollution Discharge Elimination System (NPDES) requirements for stormwater management for construction activities from the appropriate issuing authority. Compliance requires that there be properly designed Best Management Practices (BMPs), properly installed BMPs, and inspection and maintenance of the installed BMPs.

2.2.5.2 Implementation. The Design Professional will depict upon the Site Plan its initial recommendations as to elements of the erosion, sedimentation, and pollution control plan, specifying his recommended design of BMPs for the Project, including stormwater management facilities, and other like matters. It is the Contractor's responsibility to review the design of the BMPs and submit any changes to the plan, including the Contractor's desired use of entrances to the Site, Contractor's trailer(s) location, laydown areas and other similar matters affecting the design and implementation of the BMPs. The Design Professional and Contractor shall arrive at a final sealed Site Plan for submission to the permitting officials that enables the land disturbance permitting of the Project. The Design Professional and Contractor shall resolve with the local permitting official any deficiencies by the end of the Pre-commencement period.

2.2.5.3 Installation, Inspection, and Maintenance. The Contractor is responsible for installation and maintenance of the BMPs as a part of its Bid. The Design Professional shall obtain the services of a qualified testing laboratory to inspect the BMPs in accordance with the permits, the costs of such inspections to be borne by the Owner. In the event of Abnormal Weather Conditions or *force majeure*, the Contractor shall be compensated for re-installation of BMPs at established Unit Prices.

2.2.6 Geological and Archeological Specimens. If, during the execution of the Work, the Contractor, any Subcontractor, or any servant, employee, or agent of either should uncover any valuable material or materials, such as, but not limited to, treasure trove, geological specimens, archival material, archeological specimens, or ore, the Contractor acknowledges that title to the foregoing is vested in the Owner. The Contractor shall notify the Owner upon the discovery of any of the foregoing, shall take reasonable steps to safeguard it, and seek further instruction from the Design Professional. Any additional cost incurred by the Contractor shall be addressed under the provision for changed conditions. The Contractor agrees that the Geological and Water Resources Division and the Historic Preservation Division of the Georgia Department of Natural Resources may inspect the Work at reasonable times.

SECTION 3 – CONSTRUCTION PHASE

PART 1 – CONSTRUCTION PHASE SERVICES

3.1.1 Basic Construction Services.

3.1.1.1 Requirement to Commence Work. The Contractor shall under all circumstances commence work under this Contract no later than ten days after the Proceed Order Date of the Proceed Order.

3.1.1.2 Payment for Services and Work. Unless otherwise stipulated, the Contractor shall provide and pay for all materials, supplies, labor, services, water, tools, equipment, light, power, transportation, and other utilities and facilities necessary for the proper execution and completion of the Work.

3.1.1.3 Quality of Materials and Workmanship. Unless otherwise specified, all materials shall be new, and both workmanship and materials shall be of good quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials and work. The burden of proof is on the Contractor.

3.1.1.4 Quality and Discipline of Employees. The Contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the work any unfit person or anyone not skilled in the work assigned to him.

3.1.1.5 Failure of the Contractor to Supply Workmen. A Notice of Non-Compliant Work may be issued for failure of the Contractor to supply enough workers or enough materials or proper materials.

3.1.1.6 Superintendence and Supervision by Contractor.

3.1.1.6.1 Supervision by Contractor. The Contractor shall give efficient supervision to the work, using his best skill and attention. He shall carefully study and compare all drawings, specifications, and instructions and shall at once report to the Design Professional any error, inconsistency, or omission that he may discover, but he shall not be held responsible for their existence or discovery.

3.1.1.6.2 Superintendent of Contractor. The Contractor shall keep on this work during its progress and until the Final Certificate has been executed by the Design Professional a competent Project Superintendent and any necessary assistants, all satisfactory to the Design Professional and Owner. The Project Superintendent shall not be changed except with the consent of the Owner and the Design Professional unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in his employ. The superintendent represents the Contractor and all directions given to the superintendent shall be as binding as if given to the Contractor.

3.1.1.6.3 Replacement Project Superintendent. If the Contractor terminates the Project Superintendent or, if the Contractor, for any reason, engages a Project Superintendent different from the one originally assigned to the Project, Contractor must ensure that the replacement Project Superintendent has similar qualifications and experience as the originally identified Project Superintendent. Furthermore, the Contractor must obtain the Owner's prior written approval before engaging a permanent replacement Project Superintendent.

3.1.2 Measurements and Dimensions. Before ordering material or doing work that is dependent upon coordination with building conditions, the Contractor shall verify all dimensions, elevations, grades, and pitch by taking measurements at the building and shall be responsible for the correctness of same. Any discrepancies between the drawings and/or specifications and the existing conditions shall be referred to the Design Professional for additional instructions before any work affected thereby is begun.

3.1.3 Rain Water, Surface Water, and Back-up. The Contractor shall protect all Work, including but not limited to, excavations and trenches, from rainwater, surface water, and back up of drains and sewers. The Contractor shall furnish all labor, pumps, shoring, enclosures, and equipment necessary to protect and to keep the Work free of water.

3.1.4 Dust Control. Dust-proof enclosures or partitions for protection wherever dusty or dirty work is performed and dampening of debris to avoid dusting when removed shall be provided and included as a cost of the work.

3.1.5 Cutting, Patching, and Fitting. The Contractor shall do all cutting, patching, and fitting of the Work that may be required to make its several parts come together properly and fit.

3.1.6 Space Conditions. All pipes passing through floors, walls, and ceilings shall be installed with sufficient space between them to permit installation of pipe insulation and floor, wall, and ceiling plates without cutting of insulation or plates. Roughed-in dimensions shall be prepared by the Contractor to accomplish this requirement. The Contractor shall locate all equipment that must be serviced, operated, or maintained in fully accessible positions. This provision includes but is not limited to valves, traps, cleanouts, motors, controllers, switchgear, drain points, filter, access doors, and fire dampers. If spaces, dimensions, or other design conditions do not permit compliance with the present article, the Contractor shall file a request in writing with the Design Professional for additional instructions, furnishing a copy to the Owner.

3.1.7 Cleaning Up.

3.1.13.1 During Construction. At all times, the Contractor shall keep the premises free from accumulations of waste material or rubbish caused by his employees, Trade Contractors, or work. Periodically during the course of the Work he shall remove all his rubbish from and about the building and all his tools, scaffolding, and surplus materials and shall leave his work "broom-clean" or its equivalent, unless more exactly specified. Prior to Final Completion by a Trade Contractor of any Trade Contract, Contractor shall require the Trade Contractor to remove from the Work and Site all temporary systems, tools, equipment, machinery, and surplus materials not required for the continued performance of any Work under the Trade Contract or this Contract. In case of dispute, after 48 hours written notice the Owner may remove the rubbish and charge the cost to the Contractor.

3.1.13.2 Prior to Material Completion. Prior to the inspection for Material Completion of the Project Contractor shall remove from the Site all wastes and rubbish, clean all tile and glass surfaces, replace broken glass, remove stains, paint spots, and clean and polish all plumbing fixtures and equipment, leave the Work "*vacuum clean"* or its substantial equivalent, all hard surface floors swept and mopped, all carpeted floors vacuumed, all surfaces other than floors dusted, blower dusted, or wiped (depending on type of surface) and surface blemishes cleaned, all glazing washed [both sides], and all electrical and mechanical equipment and fixtures cleaned, with all ductwork cleaned and filters replaced, if such are dirty, before other cleaning is started, and re-cleaned if any dust or dirt has gotten into the ductwork during the cleaning process. The Contractor shall restore existing facilities such as roads, other paved surfaces, fencing, curbing and the like at the Site to at least their preconstruction conditions; provided, however, the Contractor may, in an orderly fashion, leave such equipment and supplies at the Site as necessary to achieve Final Completion of the Project. This cleaning must be completed before the Contractor can expect the Design Professional to commence the inspection for Material Completion. To achieve Material Completion, the Contractor shall have fully cleaned the Site – all debris must have been removed from the site and all paved surfaces must have been broom swept and thoroughly hosed down.

3.1.8 Duty of Contractor to Report Defects. If any part of the Contractor's work depends for proper execution or results upon the work of any Separate Contractor to the Owner, the Contractor shall inspect and promptly report to the Design Professional any apparent defects in such work that render it unsuitable for such proper execution and results.

3.1.9 Duty of Contractor to Report Conflicts. To ensure the proper execution of his subsequent work, the Contractor shall measure work already in place and shall at once report to the Design Professional any discrepancy between the executed Work and the drawings or specifications.

PART 2 – CHANGES TO THE WORK

3.2.1 Acknowledgement of Existing Physical Conditions. In undertaking the work under this Contract, the Contractor acknowledges that he has visited the premises and has taken into consideration all open and apparent conditions that might affect his work. No claim based on lack of knowledge of existing conditions shall be allowed unless the existing physical conditions cannot be discovered by a reasonably observant person. Any claims relating to conditions that are materially different from the Contract Documents that were not open and apparent may be adjusted as provided in this Part.

3.2.2 Owner's Right to Make Changes. Without invalidating the Contract, the Owner, by Change Order and without notice to the sureties, may authorize or order extra work or changes by altering, adding to, or deducting from the Work or the Contract Time, the Contract Sum being adjusted accordingly. All Change Orders shall be performed under the conditions of the original Contract except that any claim for extension of time caused thereby shall be adjusted at the time of signing of the Change Order. (See Change Order formats in Section 7.) Prior to the issuance of the Proceed Order, the Contractor and the Owner shall advise each other in writing of their designees authorized to accept and approve changes to the Contract Sum and the limits to each designee's authority. Should any designee or limits of authority change during the time this Contract is in effect, the Contractor or Owner shall give written notice to the other as provided in Article 1.1.5. There is no legal limitation on the Owner's right to make changes such as may be, in the Owner's sole discretion, useful or desirable to the Project.

3.2.3 Changes Forbidden without Consent of Owner. Neither the Design Professional nor the Contractor shall make any change whatsoever in the work without an approved Change Order. In the absence of an approved Change Order, the Contractor shall have no claim for payment, repayment, reimbursement, remittance, remuneration, compensation, profit, cost, overhead, expense, loss, expenditure, allowance, charge, demand, hire, wages, salary, tax, cash, assessment, price, money, bill, statement, dues, recovery, restitution, benefit, recoupment, exaction, injury, damages, or time based upon or resulting from any change. The provisions of this Article do not apply to emergencies as described in Article 1.4.4.

3.2.4 Form and Execution of Change Orders.

3.2.4.1 The Change Order. The Change Order is the instrument by which adjustments in the Contract Sum and the Contract Time are effected. The Change Order shall be accompanied by a breakdown as set forth in Paragraph 3.2.7.4. The breakdown is for the purpose of enabling the Design Professional and the Owner to make a judgment on the dollar amount of the adjustment in the Contract Sum and is not a part of the Change Order. No condition, term, qualification, limitation, exception, exemption, modification, or proviso, except as set forth in this Part, shall appear in the breakdown. Only such conditions, terms, qualifications, limitations, exceptions, exemptions, modifications, and provisos as are permitted under this Part are valid. The Design Professional shall certify to the dollar amount and description of the adjustments permitted by the Change Order.

3.2.4.2 Execution of Change Orders. Change Orders shall be signed by the Contractor, ordinarily certified by the Design Professional, and approved by the Owner in accordance with the form of Change Order prescribed by the Owner. No request for payment by the Contractor for a Change Order shall be due, nor shall any such request appear on an Application for Payment, until the Change Order is executed by the Owner. In the event of emergency (*see* Article 1.4.4) or significant impact to the Overall Project Schedule, the Owner shall direct the Change Order to proceed upon a Force Account until the cost and time is resolved in the manner set forth in Paragraph 3.2.7.3 below.

3.2.4.3 Disagreement between Design Professional and Contractor.

3.2.4.3.1 As to Contract Sum. Should the Design Professional disagree with the Contractor as to the amount of the adjustment to the Contract Sum and such disagreement is not resolved between them within seven days, the Owner, if it desires the Change Order work to proceed, may direct a Change Order for Force Account or Indeterminate Units.

3.2.4.3.2 As to Contract Time. Should the Design Professional disagree with the Contractor as to the amount of the adjustment to the Contract Time and such disagreement not be resolved between them within seven days, the decision of the Design Professional as to any adjustment in the Contract Time, including any designation by the Design Professional of such time as is eligible for Time Dependent Overhead Costs, shall be final, subject to protest to the Owner of the Design Professional's decision as set forth in Section 5 Part 2.

3.2.4.3.3 As to Other Disagreements. Should the Design Professional disagree with the Contractor as to matters other than Contract Sum or Contract Time, the dispute shall be resolved by the Owner as set forth in Section 5, Part 2.

3.2.4.4 Change Order Conditions. All Change Orders are issued under the following conditions and shall contain the following language as appropriate:

3.2.4.4.1 For Lump Sum Change Order: The payment and extension of time (if any) provided by this Change Order constitutes compensation in full to the Contractor and its Subcontractors and Suppliers for all costs and markups directly and indirectly attributable to the Change Order herein, for all delays related thereto and for performance of changes within the time stated.

3.2.4.4.2 For Force Account or Indefinite Amount Change Order: The payment and extension of time (if any) provided by this Change Order constitutes interim compensation to the Contractor and its Subcontractors and Suppliers for actual costs and markups directly and indirectly attributable to the Change Order herein, for all delays related thereto and for performance of changes within the time stated.

3.2.4.4.3 For All Change Orders: Any changes or reservations by the Contractor to the representations and releases in the Change Order, or refusal of the Contractor to execute the Change Order, shall be a material breach of this Contract that may be sufficient cause to issue a declaration of default.

3.2.5 All Cost and Time Impacts to be Included. Each Change Order shall include all time and monetary impacts of the change. Failure to include a change in Contract Time or in Contract Sum in Change Orders shall be considered a zero price/zero time Change Order and shall waive any change in Contract Time and Contract Sum. Commencement of Work upon a Change Order is conclusive proof that the Contractor accepts the Change Order.

3.2.6 Changes in Contract Time. All Change Orders must state that the Contract Time and the Material Completion and Occupancy Date either are not changed or are increased or decreased by a specific number of Days. The CONTRACTOR must provide written justification for the extension to the Design Professional and to the Owner. The written justification must demonstrate an anticipated actual increase in the time required to complete the Work beyond that allowed by the Contract as adjusted by prior Change Orders to the Contract. No extension to the Contract Time shall be allowed unless the additional or changed Work increases the length of the critical path beyond the Material Completion and Occupancy Date. If approved, the increase in time required to complete the Work shall be added to the Contract Time. The Owner may decrease, by Change Order, the Contract Time when an Owner-requested deletion from the Work results in a decrease in the actual time required to complete the Work as demonstrable on the critical path of the Construction Progress Schedule. Eligibility and processing requirements for Time Dependent Overhead Costs for compensable delay is addressed in Article 3.3.8 and 3.3.10.

3.2.7 Determining the Cost to Owner for Changes. The cost to the Owner of any change shall be determined in one or more of the following ways:

3.2.7.1 Lump Sum. The Change Order cost is determined by mutual agreement as a lump sum amount changing the Contract Sum allowed for completion of the Work. The Change Order shall be substantiated by documentation itemizing the estimated quantities and costs of all labor, materials and equipment required as well as any mark-up used. The price change shall include the cost percent allowed for the Contractor's overhead and profit and, if eligible, Time Dependent Overhead Costs.

3.2.7.2 Unit Price Work. The Change Order cost is calculated by using unit prices and calculating the number of net units of Work in each part of the Work that is changed, either as the Work progresses or before Work on the change commences, and by then multiplying the calculated number of units by the applicable unit price set forth in the Contract or multiplying by a mutually agreed unit price if none was provided in the Contract. No

additional percentage markup for overhead or profit shall be added to the unit prices as this markup is included within the unit prices. Time Dependent Overhead Costs will be added if eligible.

3.2.7.3 Force Account. The Change Order cost is accomplished by Force Account in the event the Contractor and Design Professional cannot agree on the cost of the Change Order or the cost cannot be reasonably determined prior to beginning the Work.

3.2.7.3.1 A Force Account is the establishment by the Owner's Incumbrance Record of a maximum dollar amount (Stipulated Maximum Sum) beyond which no changed work may be undertaken, subject to amendment, for funding all costs of a Change Order. As the Work authorized by the Change Order progresses, the Contractor must provide an accounting of actual costs incurred in accomplishing the Work. The accounting must include an annotated copy of the Overall Project Schedule to accurately show the status of the Work at the time the Change Order utilizing a Force Account is issued, to show the start and finish of the changed Work, and to show the status of the Work when the changed Work is completed.

3.2.7.3.2 Actual costs, except as otherwise agreed to in writing by the Owner, shall not exceed those prevailing for the trades or crafts, materials, and equipment in the locality of the Project, may include only those items listed as allowable in Article 3.2.9, and shall not include any of the costs listed as not allowable in Article 3.2.10. The Owner shall be permitted, on a daily basis, to verify such records and may require such additional records as are necessary to determine the cost of the change to the Work.

3.2.7.3.3 The Owner shall prescribe the dollar limit for a Force Account in writing by authorizing a Stipulated Maximum Sum of money to be committed toward execution of the said change, and the Contractor shall have no authority to perform any change that will cost the Owner in excess of the Stipulated Maximum Sum. The Stipulated Maximum Sum shall be based on the estimated cost of the Work and the Contractor's allowance for overhead and profit as set forth in 3.2.8 below, including any time extension, Time Dependent Overhead Costs (if eligible), and a reasonable contingency. It shall be the sole responsibility of the Contractor to apply in writing to the Owner, NOT to the Design Professional, for an increase in the Stipulated Maximum Sum if the total value of the Work is approaching and might exceed the Stipulated Maximum Sum.

3.2.7.3.4 Within fourteen days of the conclusion of such Work ordered by Force Account, the Contractor and the Owner shall arrive at the total lump sum cost for the Change Order. Such lump sum cost shall be incorporated into and finalize the Change Order, and shall reference and close the Incumbrance Record establishing the Force Account.

3.2.7.4 Breakdown of Expenditures. The Contractor shall review any Owner requested or directed change and shall respond in writing within fourteen calendar days after receipt of the proposed change (or such other reasonable time as the Owner may direct), stating the effect of the proposed change upon his Work, including any increase or decrease in the Contract Time and Sum. The Contractor shall furnish to the Owner and the Design Professional an itemized breakdown of the quantities and prices and expenditures for labor and materials used in computing the proposed change in Contract Sum, in the form prescribed by the Owner, and the breakdown shall be accompanied by the following declaration:

> *I do solemnly swear to the best of my knowledge, information, and belief, that the costs shown hereinabove do not exceed current costs for like services or materials in the locality of the Project and, in the case of a Force Account, the costs represented do not exceed the actual costs to the Contractor; and that the quantities shown do not exceed actual requirements.*

The Contractor shall obtain and furnish as back up to the Contractor's breakdown a separate breakdown for each subcontractor's charges prepared by each subcontractor on the letterhead of the subcontractor and properly signed by the subcontractor. The Owner shall review the Contractor's proposal and respond to the Contractor within fourteen days of receipt.

3.2.8 Cost Allowable for Changes to the Work, Allowances for Contractor, and Permissible Expenditures.

3.2.8.1 Overhead and Profit. The percentage for overhead and profit to be used in calculating additive changes in the Work (not including changes covered by unit prices) shall not exceed the percentages for each category listed below. Said percentages for overhead and profit shall be applied only on the net cost of the changed Work, (i.e., the difference in cost between original and revised Work).

3.2.8.1.1 Contractor. If the Contractor does all or part of the changed Work with employees that work directly for the Contractor, its markup for overhead and profit on the changed Work the Contractor performs with its employees shall be twenty-five percent of the first $50,000 of the net Allowable Costs, and twenty percent of the remaining net Allowable Costs, if any.

3.2.8.1.2 Subcontractor. If a Subcontractor does all or part of the changed Work with employees that work directly for the Subcontractor, the Subcontractor's markup for overhead and profit on the Work the Subcontractor performs with its employees shall be twenty-five percent of the first $50,000 of the net Allowable Costs, and twenty percent of the remaining net Allowable Costs, if any. Determination of a Subcontractor's extended overhead costs, if any, is the responsibility of the Contractor.

3.2.8.1.3 Contractor's Markup on Subcontractor' Work. The Contractor's management markup on the subcontractor's net additional allowable expenditures shall be seven and one half percent. The Contractor shall not be permitted the overhead and profit markup on Time Dependent Overhead Costs, but shall be permitted a management markup of five percent on Time Dependent Overhead Costs.

3.2.8.1.4 Second and Lower Tier Subcontractor. If a Subcontractor at any tier does all or part of the changed Work with its employees, the Subcontractor's markup on the Subcontractor's work with its employees shall be twenty-five percent of the first $50,000 of the cost, and twenty percent of the remaining cost, if any. The management markup of a Subcontractor's work by the Contractor and all intervening tiers of Subcontractors shall not exceed seven and one half percent for the Contractor and any Subcontractor, or a total of fifteen percent for the changes to the Work.

3.2.8.2 The above percentages shall be applied to the net Allowable Costs, if any, as limited and defined in this Part. If the net difference between Allowable Costs and credits to the Owner results in a decrease in the Owner's cost, the amount of credit allowed the Owner shall be the net decrease without any allowance for profit and overhead. Other than any eligible Time Dependent Overhead Costs, all costs that are not Allowable Costs in Article 3.2.9 or are disallowed in Article 3.2.10 shall be considered as overhead and shall be exclusively compensated in the allowances provided for in paragraph 3.2.8.1 above.

3.2.9 Allowable Costs for Changes in the Work. Allowable cost for changes to the Work are limited to the following:

3.2.9.1 Labor costs for employees directly employed in the change in the Work, including salaries and wages plus the cost of payroll charges and fringe benefits and overtime premiums, if such premiums are explicitly authorized by the Owner, set at rates established in the manner set forth in Article 2.1.7.

3.2.9.2 Materials incorporated into the change to the Work, including costs of transportation, handling, fuel, and on-site storage, if applicable.

3.2.9.3 Equipment incorporated in the changed Work or equipment used directly in accomplishing the Work. If the equipment is rented expressly for accomplishing the change in the Work, that cost shall be the rental rate according to the terms of the rental agreement, which the Owner shall have the right to approve, or shall be set at rates established in the manner set forth in Article 2.1.7. The decision of the Owner shall be final, binding, and conclusive on all parties.

3.2.9.4 Costs of increases in premiums for the Contractor's Payment Bond and Performance Bond or for bond premiums for its Subcontractors, to the extent that such increased costs are a result of coverage adjustments for changes in Work approved by the Owner. Prior to requesting payment for the Change Order work, the Contractor shall provide proof of its notification to the Surety of the change in the Work and of the Surety's agreement to include such change in its coverage. The cost of the increase in premium shall be an allowable cost but shall not be marked up. In no event shall a cost in excess of two percent of the cost of the change be allowable.

3.2.9.5 Sales, consumer, use, and other applicable taxes that are legally in effect at the time the change order is approved.

3.2.9.6 Any other costs directly attributable to the change in the Work, such as professional engineering costs, except those set forth in Articles 3.2.8 and 3.2.10.

3.2.9.7 For Change Order Work directed by the Owner, where the headquarters of the Subcontractor actually performing the work is more than 100 miles from the Project Site, the Subcontractor may include in the cost of the Change Order a stipend of fifty dollars per day for each worker performing work at the Site if that worker is receiving a per diem under present company policy, not to exceed the number of workers and number of days determined by Design Professional's decision to be attributable to the new work so ordered, so long as the number of workers and number of days attributable to any deleted work is deducted there from. No allowance for overhead or profit as set forth in Article 3.2.8 may be added to the Change Order cost on account of the stipend amount, and the full amount of the stipend must be actually paid to the eligible worker or it shall be forfeited by the Contractor and Subcontractor(s).

3.2.9.8 The Owner may require any or all of the following documentation to be provided by the Contractor to support the Allowable Costs:

(a) certified payroll records showing the name, classification, date, daily hours, total hours, rate, and extension for each laborer, foreman, supervisor or other worker;
(b) equipment type & model, dates, daily hours, total hours, rental rate or other specified rate, and extension for each unit of equipment;
(c) invoices for materials showing quantities, prices, and extensions;
(d) daily records of waste materials removed from the Site and/or fill materials imported to the Site;
(e) certified measurements of over excavations, piling installed and similar work; and/or
(f) transportation records for materials, including prices, loads, and extensions.

3.2.10 Costs Not Allowable for Changes in the Work. Costs not allowable under any circumstances are as follows:

3.2.10.1 Costs due to the negligence of the Contractor, Subcontractors, or other persons for whom the Contractor is responsible, including but not limited to costs of delay, costs for the correction of Non-Compliant Work, costs for improper disposal of material, costs for equipment wrongly supplied, costs for the Contractor's delay in performing the Work, or costs for delay in ordering and obtaining normally available materials or equipment.

3.2.10.2 Home office expenses, including payroll costs for the Contractor's or any Subcontractors' officers, executives, administrators, accountants, counsel, engineers, timekeepers, estimators, clerks, and other similar administrative personnel employed by the Contractor, whether at the Site or in the Contractor's or a Subcontractor's principal or branch office for general administration of the Work (including those referred to as "Eichlay costs"). These costs are deemed overhead included in the percentage markups allowable in Article 3.2.8 above.

3.2.10.3 Home and branch office expenses that include, but are not limited to, expenses of Contractor's home and branch offices, Contractor's capital expenses, interest on Contractor's capital used for the Work, charges for delinquent payments, small tools, incidental costs, rent, utilities, telephone and office equipment, and other general overhead expenses of the home and branch office (including those referred to as "Eichlay costs").

3.2.10.4 Where Work is deleted from the Contract (by Bulletin, Change Order, or otherwise) prior to commencement of that Work without substitution of other similar Work, one hundred percent of the Contract Sum attributable to that Work shall be deducted from the Contract Sum. However, in the event that material submittals have been approved and orders placed for said materials, a lesser amount as justified by proper documentation shall be deducted from the Contract Sum. The credit if any to the Owner for reduced premiums on payment bonds and performance bonds shall be in all cases one hundred percent of the credit. If the deductive Change Order affects the critical path or the schedule and it causes an overall reduction in the Contract Time, jobsite time dependent expenses shall be included in the deduction at the rate established in the Contract for Time Dependent Overhead Costs.

3.2.10.5 Wages of a foreman, if the foreman is concurrently supervising other Work at the Site.

3.2.10.6 Premiums for bonds required of Subcontractors by the Contractor.

3.2.11 Change Order Formats. Formats for Lump Sum Change Orders and for Change Orders based upon either a force account or upon unit pricing with an indeterminate number of units are in Section 7, Forms.

3.2.12 Changes due to Subsurface or Other Unforeseen Conditions.

3.2.12.1 Subsurface Conditions. Unless the Contract Documents stipulate specific quantities and units of rock or unsuitable soils, the Contractor shall assume material below the surface of the Earth to be earth and other material that can be removed by power shovel or similar equipment. Should conditions encountered below the surface of the ground be at variance to the number of unit requirements as indicated by drawings or specifications, and absent an agreed-upon unit price established prior to the bid by Addendum, or after contract execution by Change Order, the Contract Sum and/or time shall be adjusted as provided in the Contract Documents for changes in the work.

3.2.12.2 Other Unforeseen Conditions. If unknown physical conditions are encountered at the Site that differ materially from those indicated in the Contract Documents, then the Contractor shall give notice to the Design Professional promptly before conditions are further disturbed, but in no event later than two business days after the first observance of the conditions. The Design Professional shall promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost or time required for performance of any part of the Work, the Design Professional may recommend an adjustment by Change Order to the Contract Sum or Contract Time, or both. If the Design Professional determines that the conditions at the Site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Design Professional shall so notify the Owner and the Contractor in writing, stating the reasons. Protest by either party of the Design Professional's decision shall be in accordance with Section 5, Part 2.

3.2.13 Compensable Rock. CAUTION: No rock for which extra compensation is expected to be received shall be removed except pursuant to and in conformity with a written authorization or order of the Owner. Unless otherwise provided in the Bid Documents, no removal of rock as defined herein shall be included in the Bid. Shale, rottenstone, or stratified rock that can be loosened with a pick or removed by a hydraulic excavator equivalent to a Caterpillar Model 215, a single engine pan (Caterpillar 621 or equivalent) that is pushed by a crawler tractor (Caterpillar D-8K or equivalent), or similar equipment shall not be classified as rock.

3.2.13.1 Definitions of Compensable Rock. Rock, for the purposes of pricing its removal, is defined as follows:

3.2.13.1.1 Rippable Rock. Rippable rock is defined as any material that can be ripped with a single-tooth hydraulic ripper drawn by a crawler tractor having a minimum draw bar pull rated at not less than 56,000 pounds (Caterpillar D-8K or equivalent) and occupies an original volume of at least one cubic yard.

3.2.13.1.2 Mass Rock. Mass rock is defined as any material that cannot be ripped with a single-tooth hydraulic ripper drawn by a crawler tractor having a minimum draw bar pull rated at not less than 56,000 pounds (Caterpillar D-8K or equivalent) and occupies an original volume of at least one cubic yard.

3.2.13.1.3 Trench Rock. Trench rock is defined as any material that must be removed from a trench that cannot be excavated with a hydraulic excavator having a bucket curling force rated at not less than 18,300 pounds (Caterpillar Model 215 or equivalent) and occupies an original volume of at least one-half cubic yard.

3.2.13.1.4 Caisson Rock. Caisson Rock is defined as material that must be removed from a shaft which cannot be penetrated faster than two feet per hour (fifteen minute minimum) using a rock auger with bullet-shaped hardened steel teeth (Kennametal bits or equivalent), and the drilling equipment should have the capacity to produce a continuous torque of at least 1,000,000 inch pounds and a downward force of at least 50,000 pounds (a Hughes LLDH in good working condition) for piers up to seventy two inches in diameter. Use of equipment with greater torque or downward force modifies the definition of refusal to be the point at which the equipment cannot penetrate faster than two feet per hour (fifteen minute minimum). In rare cases, refusal may occur on a rock seam or boulder above the general massive rock surface. The compensation for Caisson Rock should include only material that cannot be penetrated by the rock auger at the specified rate.

3.2.13.2 Pricing for Compensable Rock. All compensable rock shall be priced by unit prices upon volume prior to removal and shall be calculated by survey and engineering calculations. No rock shall be priced by truckload, bucket load, or other similar pricing methods. Unit prices shall be determined prior to removal, either in the Contract Documents or by Change Order. Unit prices shall be inclusive of all profit and overhead, except for Time Dependent Overhead Costs. Unit prices shall include the following:

(a) Excavation and removal of all rubble;
(b) Addition and removal of overburden for blasting;
(c) Excavation of all blast rubble;
(d) Replacement of suitable soils in areas of overblasting or over removal; and
(e) All costs of labor, equipment, supplies, blasting materials, safety requirements, drayage, haulage, and disposal, including offsite disposal costs.

The Contractor expressly agrees that the Contractor's sole monetary remedy for extensions of Contract Time due to removal of rock that materially affects the completion of the Work by lengthening the critical path of the Overall Project Schedule shall be the daily rate established in the Time Dependent Overhead Costs in the Contract. Extensions of Time and compensation for Time Dependent Overhead Costs for compensable rock are to be processed as a Change Order pursuant to Article 3.2.6.

3.2.14 Subcontractor Claims for Extended General Conditions Costs. The daily rate for Time Dependent Overhead Costs established in the Contract is intended to compensate the Contractor for the additional jobsite overhead costs resulting from any compensable time extension. The Contractor, in its sole discretion, shall be responsible for allocating the Time Dependent Overhead Costs among its affected subcontractors and itself. Owner's payment of the Time Dependent Overhead Costs to the Contractor, and Contractor's allocation thereof, shall constitute the only monetary compensation the Contractor and subcontractors shall be entitled to receive as reimbursement for Time Dependent Overhead Costs incurred as a result of any compensable delay to the Project.

3.2.15 Release of Claims. The execution by the Contractor of a Change Order shall be and operate as a release to the Owner of all claims by the Contractor and of all liability owing to the Contractor for all things done or furnished in connection with the Work described in the Change Order. The execution of any Change Order by the Owner shall not be an acceptance of any Work or materials not in accordance with the Contract Documents, nor shall it relieve the Contractor of responsibility for faulty materials or workmanship or operate to release the Contractor or his surety from any obligation arising under the Contract or the Performance Bond or Payment Bond.

3.2.16 Sole Source Designation for Change Order Work.

3.2.16.1 Definition of Sole Source. As used in this Article 3.2.16, "Sole Source" means a Trade Contractor or Supplier or Subcontractor specified by name in a Bulletin as the exclusive source from which conforming goods or services may be obtained. Designation of goods or services by reference to a named source accompanied by the qualification "or equal" or similar language is not a designation of a Sole Source as that term is defined herein.

3.2.16.2 Limitations. This Article 3.2.16 applies only to Bulletins referenced in a proposed Change Order that designates a Sole Source that was not designated in the Bidding Documents. Except as stated in this Article, the Contractor's inability to obtain payment and performance bonds from Sole Source Subcontractors or warranties from Subcontractors, as required under the Bidding Documents for this Contract, shall not otherwise excuse the Contractor from its bonding and warranty obligations under this Contract.

3.2.16.3 Sole Source as Grounds for Rejection of a Change Order. If a Change Order is submitted to Contractor for the purposes of adding a Bulletin to this Contract and said Bulletin designates a Sole Source from which Contractor is required to procure goods or services necessary to perform the Work, which Sole Source has not been designated previously, Contractor shall be entitled to reject the proposed Change Order if the designated Sole Source refuses to provide to Contractor the warranties, bonds, terms or schedule required under the Contract Documents, including any warranty or terms or schedule required by Bulletins referenced in the proposed Change Order. In such event, Contractor shall give written notice to the Owner rejecting the proposed Change Order and, if possible, shall accompany said written notice with a proposal from Contractor for changes or modifications to the Bulletin so as to eliminate the Sole Source designation but to achieve goods or services equal in quality or function. The Owner may then require the Design Professional to revise the subject Bulletin so as to eliminate the designation of the Sole Source by incorporation of Contractor's proposal or otherwise. Upon revision of the Bulletin by the Design Professional and approval thereof by the Owner, the Owner shall again submit to the Contractor a proposed Change Order for the purpose of adding the revised Bulletin to this Contract. If the Owner decides to retain the Sole Source in the Change Order and Contractor

cannot acquire the full contractually required warranties from the Sole Source, Contractor shall be held only to the warranty terms and schedule obtainable from the Sole Source.

3.2.16.4 No Excuse Without Notice. If Contractor accepts a proposed Change Order adding a Bulletin to this Contract that designates a Sole Source without invoking this Article and putting the Owner on notice, Contractor shall not be excused from its obligations with respect to the described Work by reason of the refusal of a designated Sole Source to provide warranties as required under this Contract.

PART 3 – TIME

3.3.1 Time is of the Essence. Time is of the essence of this Contract and all obligations hereunder.

3.3.2 Competent Management of Time. The Contractor has represented to the Owner, in order to be awarded this contract, that the Contractor is experienced in managing construction in accordance with contract requirements and in a timely manner and that the Contractor has included in his proposal sufficient sums to carefully and competently manage this project for completion within the stipulated Contract Time.

3.3.3 Contract Time.

3.3.3.1 Fair and Reasonable. The Contractor has carefully examined and analyzed the Site, the Contract Documents, and all known factors related to his ability to complete this project within the Contract Time stipulated. By submitting his bid for this project, the Contractor agrees that the stipulated Contract Time is fair and reasonable.

3.3.3.2 Delays. The parties recognize there may be delays to perform Change Order work in the event that conditions encountered at the Site are different from those indicated in the Contract Documents, or to perform Change Order work to correct errors in the plans and specifications. Execution of any change must be authorized. In such event, there shall be an adjustment in the Contract Sum as provided in the Contract Documents for changes in the Work, The parties agree that such delays are not a ground for claiming extraordinary remunerations except as set forth in this Contract in Article 3.3.8 below.

3.3.4 Commencement, Prosecution, and Completion.

3.3.4.1 Commencement, Prosecution, and Completion of Work. The Contractor will be required (a) to commence the Work under this Contract on the applicable Proceed Order Date, (b) to prosecute the Work with faithfulness and energy (c) to install the various parts of the work with equal steps shown on the Overall Project Schedule and at the same rate (or better) shown on the Overall Project Schedule and (d) to complete the Work within the Contract Time, as adjusted. Commencement of the Work shall mean actual physical work on the Site. Unless otherwise agreed, and subject to Change Orders, Material Completion of the Project must be achieved on or before the date established as the Material Completion and Occupancy Date under the Schedule.

3.3.4.2 Contractor's Acceleration for failure to meet Schedule Requirements. In the event the Contractor shall be delinquent in respect to achieving the Milestone dates established in the Overall Project Schedule, Contractor shall, within seven days after receipt of written demand of the Owner, cause its employees and Subcontractors to perform work at an accelerated pace with hours and days in addition to the normal working hours and working days, as necessary to promptly bring the Work into compliance with the Overall Project Schedule. Fulfillment of this requirement as to overtime work shall not relieve the Contractor from liability for breach of the covenant as to time. For account of recovery of lost time required of the Contractor for its breach of covenant as to time, the Contractor shall be entitled to no claim against the Owner for any payment, repayment, reimbursement, remittance, remuneration, compensation, profit, cost, overhead, expense, loss expenditure, allowance, charge, demand, hire, wages, salary, tax, cash, assessment, price, money, bill, statement, dues, recovery, restitution, benefit, recoupment, exaction, injury or damages.

3.3.5 Construction Progress Schedule (Overall Project Schedule).

3.3.5.1 Submittal, Approval, and Updates. Not later than sixty days after the Effective Date of the Contract, but prior to the Proceed Order, the Contractor must submit a Construction Progress Schedule in accordance with Section 2.1.5.

3.3.5.2 Approval of Overall Project Schedule. . Upon recommendation by the Design Professional and approval by the Owner, the Construction Progress Schedule shall become the Overall Project Schedule, and becomes a part of this Contract. The Overall Project Schedule shall govern the schedule of activities of the Contractor under this Contract

3.3.5.3 Monthly Updates. The Contractor must provide the Design Professional and the Owner with monthly updates of the Overall Project Schedule indicating completed activities and any changes in sequencing or activity durations. (See also Articles 2.1.2 and 2.1.5).

3.3.6 Completion Date. The Work under this Contract shall be completed by midnight of the date required in the Contract as the Material Completion and Occupancy Date unless extended by approved requests for extension of time.

3.3.7 General Rule – No Damages for Delay, Extension of Time Sole Remedy. Contractor shall not be entitled to any damages for delay or to any other reimbursement as a Cost of the Work, or to an increase in the contract amount, or to payment, damages, monies, or compensation of any kind from Owner for direct, indirect, impact, or disruption damages (including but not limited to costs of acceleration of Work or any Phase thereof) arising because of delay or other hindrance of any kind whatsoever; except as specifically permitted by Article 3.3.8. Extension of the time is the Contractor's sole remedy for any delays not the fault of the Contractor.

3.3.8 Exception to General Rule – Compensable Delay. The extension of the Contract Time and the adjustment to the Contract Sum specifically provided for in this Article shall be Contractor's sole and exclusive remedy for delays, hindrances, interferences or resulting inefficiencies and re-sequencing.

3.3.8.1 Compensable Delay – Unavoidable Delay.

3.3.8.1.1 Delay by Owner or Design Professional. If the Contractor is delayed in the progress of the Work between the Proceed Order Date and the Material Completion and Occupancy Date, as amended, by an act or neglect of the Owner, Owner's employees, Design Professional or Separate Contractors employed by the Owner, or by other causes beyond the Contractor's control which the Design Professional determines are the fault of the Owner or the Design Professional and may justify delay, then the Contract Time will be extended by Change Order for such reasonable time as the Design Professional and the Owner may determine; provided, however, that (i) such delays extend the Overall Project Schedule's critical path; (ii) the Contractor has taken all reasonable actions to mitigate the effects of the delay on the Work; (iii) the fault or negligence of the Contractor, the Contractor's agents or employees did not materially contribute to such causes; and (iv) the Contractor shall have notified Owner of the cause or causes of such delay within fourteen days from the date on which the Contractor first becomes aware of such delay.

3.3.8.1.2 Delay in Responses to Submittals. Any claim by Contractor for a change in the Material Completion and Occupancy Date due to delay of responses to submittals may be made during the time while the failure of the Design Professional to act or perform continues, or within seven days after such failure to act or perform has been cured. If no Submittal Schedule or agreement as required in Paragraph 2.2.3.1 is agreed upon, then a claim for delay will be allowed only after the Design Professional has been allowed fourteen days to take action. Any claim for extension of time must be reasonable and take into consideration the nature of the submittal.

3.3.8.1.3 To be Processed as a Part of the Change Order Process. Extensions of Time and compensation for Time Dependent Overhead Costs for Unavoidable Delay are to be processed as a Change Order pursuant to Article 3.2.6.

3.3.8.2 Compensable Delay – Certain Change Orders.

3.3.8.2.1 Owner-Requested Changes. If the Owner requests changes in the Contract Documents that would materially affect the completion of the Work by lengthening the critical path of the Overall Project Schedule, the Design Professional shall determine the appropriate number of days and thereby extend the Material Completion and Occupancy Date. The Contractor expressly agrees that the Contractor's sole monetary remedy for such extensions of Contract Time shall be calculated at the daily rate established for Time Dependent Overhead Costs in the Contract.

3.3.8.2.2 Other Change Orders. For Change Orders involving the following situations that would materially affect the completion of the Work by lengthening the critical path of the Construction Progress Schedule, the Design Professional shall determine the appropriate number of days and thereby extend the Material Completion and Occupancy Date. The Contractor expressly agrees that the Contractor's sole monetary remedy for such extensions of Contract Time shall be calculated at the daily rate established for Time Dependent Overhead Costs in the Contract.

(a) Changes due to Subsurface or Other Unforeseen Conditions, Article 3.2.12.
(b) Changes for Compensable Rock, Article 3.2.13.
(c) Changes deleting work, Paragraph 3.2.10.4

3.3.8.2.3 To be Processed as a Part of the Change Order Process. Extensions of Time and compensation for Time Dependent Overhead Costs for all Change Orders are to be processed as a part of each Change Order pursuant to Article 3.2.6.

3.3.8.3 Compensable Delay – *Force Majeure*. If, between the Proceed Order Date and the Material Completion and Occupancy Date, as amended, the CM/GC is unable to perform or is delayed in the performance of any of the terms and provisions of this Contract, that materially affects the completion of the Work by lengthening the critical path of the Construction Progress Schedule, as a result of (i) governmental preemption of materials in connection with a national emergency declared by the President of the United States; (ii) riot, insurrection, acts of terror or terrorism or other civil disorder affecting performance of the Work; (iii) labor strikes that could not be reasonably anticipated, or (iv) earthquakes, or unusual and extreme weather conditions constituting Acts of God, then, and in any such event, such inability or delay shall be excused, and the time for completing the affected portions of the Project (and the entire Project, if applicable) shall be extended for such reasonable period of time as the delay has affected the critical path of the performance of the Work hereunder.

3.3.8.3.1 Mitigation of Delay. Contractor shall take all reasonable actions to minimize the delay caused by any of the above factors, and shall notify Owner in writing with a copy to the Design Professional of any event allowing for excuse or delay not later than seven days after the Contractor first becomes aware of the event, or should have become aware, of the event; otherwise Contractor will be deemed to have waived the excuse or delay.

3.3.8.3.2 To be Processed as a Part of the Change Order Process. Extensions of Time and compensation for Time Dependent Overhead Costs for *Force Majeure* are to be processed as a Change Order pursuant to Article 3.2.6.

3.3.8.4 Compensable Delay – Abnormal Weather. Extensions of time will be granted for abnormal inclement weather conditions that delay the critical path of the progress of the work.

3.3.8.4.1 Abnormal weather delay is defined as days lost to weather conditions either (i) in excess of days specified in the Supplementary General Conditions, or (ii) if not defined in the Supplementary General Conditions, as days in excess of a local historic average prevailing at the Site recorded by the National Oceanic and Atmospheric Administration (NOAA) for the 120 months immediately preceding the Proceed Order Date.

3.3.8.4.2 Not later than ten days after of the first occurrence of the event giving rise to the claim or with respect to claims for extension of time as a result of abnormal weather, and not later than ten days after the end of each calendar month thereafter, the Contractor shall file a claim with the Design Professional with a copy to the Owner. By not later than fifteen days from the receipt of the claim, the Design Professional shall render a decision concerning the allowance of an extension of time and shall report his decision to both the Contractor and the Owner.

3.3.8.4.3 Extensions of Time and compensation for Time Dependent Overhead Costs for Abnormal Weather are to be processed as a Change Order pursuant to Article 3.2.6.

3.5.8.5 Protest. The Design Professional's decision as to abnormal weather delay shall be subject to protest by either the Contractor or the Owner as set forth in Section 5, Part 2.

3.3.9 Non-Compensable Delay. Contractor understands, acknowledges and agrees that delays occasioned by the events and occurrences set forth below are not compensable delays and do not constitute reason for extending the Date for Material Completion and Occupancy. It is Contractor's responsibility to make adequate provision for the following in scheduling the Work:

3.3.9.1 Normal Weather Conditions. Weather conditions other than those that substantially vary from the normal climatology conditions that prevailed at the Site for the preceding 120 months, as evidenced by data published by the National Oceanic and Atmospheric Administration.

3.3.9.2 Delay in Delivery of Materials or Equipment. Delay in delivery of materials or equipment for any cause other than those specified in Paragraph 3.3.8.3. No claim will be approved if materials or equipment are delayed due to Contractor's tardy procurement or expediting.

3.3.9.3 All Other Delay. All delay not covered in Article 3.3.8.

3.3.10 Submission of Claims for Compensable Delay and to Extend the Material Completion and Occupancy Date.

3.3.10.1 Time for Submission. Except as specified below, any claim by Contractor for a change in the Contract Time or the Material Completion and Occupancy Date shall be made within fourteen days of the day on which the Contractor becomes aware of the event on which the claim is based or, if the Contract Documents specify a shorter or longer period with respect to such event, within the period specified by the Contract Documents.

3.3.10.2 Delay Claim Must Be In Writing. Any claim to extend the Contract Time and Material Completion and Occupancy Date must be in writing, must set forth in detail the basis for the claim and the number of days of delay claimed, must be correlated with the approved Overall Project Schedule, must be executed by the Contractor and delivered to the Design Professional and the Owner, and must be reviewed and an appropriate time assessed by the Design Professional.

3.3.10.3 When Delay Claim Deemed Waived. Any claim to extend the Contract Time and Material Completion and Occupancy Date not made in writing to Owner within the above time periods shall be deemed waived and shall not thereafter be valid. In the case of a continuing delay as a result of a single event, only one claim submission is necessary.

3.3.10.4 Design Professional to Decide. The Contract Time and the Material Completion and Occupancy Date may be extended for such reasonable time as the Design Professional may decide, and the Overall Project Schedule shall then be updated.

3.3.10.5 Payment for Extensions of Contract Time. The Contractor expressly agrees that the Contractor's sole monetary remedy for Compensable Delay shall be calculated at the daily rate established for the Time Dependent Overhead Costs in the Contract.

3.3.10.6 Claims Related to Extraordinary Time Dependent Overhead Cost. In situations where Time Dependent Overhead Costs are authorized, and the cost incurred exceeds 170% of the established Time Dependent Overhead Cost daily rate, then the Contractor may submit a claim under this article for consideration of such extraordinary additional cost.

3.3.11 Recovery of Schedule Delays.

3.3.11.1 Recovery of Schedule Delays. If the Design Professional determines that the Project is one week or more behind schedule, per the approved Overall Project Schedule, the Design Professional shall so notify the Contractor in writing. Within seven days of the date of the Design Professional's notice, the Contractor shall deliver to the Design Professional and Owner a written plan explaining how the Contractor intends to bring the Project back on schedule. The Contractor's plan must provide sufficient detail to allow the Design Professional and Owner to determine the proposal's feasibility.

3.3.11.2 Recovery of Schedule Delays During Last Sixty Days of Contract Time. At any time during the last sixty days of the Contract Time that the Design Professional finds that the Contractor is behind schedule per the Contract Time, as amended, the Design Professional shall notify the Contractor in writing. Within seven days of the date of the Design Professional's notice, the Contractor shall prepare and deliver to the Design Professional and Owner a written plan explaining how the Contractor intends to bring the Project back on schedule. The Contractor's plan must provide sufficient detail to allow the Design Professional and Owner to determine the proposal's feasibility.

PART 4 – CORRECTING THE WORK, INSPECTIONS, COVERING AND UNCOVERING WORK

3.4.1 Correcting the Work.

3.4.1.1 Notice of Non-Compliant Work. A Notice of Non-Compliant Work shall be in writing, shall be dated, shall be signed by the Design Professional, shall be addressed to the Contractor with a copy to the Owner, and shall contain three elements as follows:

3.4.1.1.1 Description of Work.

(a) that has been omitted or
(b) that is unexecuted as of the date of the Notice of Non-Compliant Work, the time for its incorporation into the work as planned in the Overall Project Schedule having expired, or
(c) that has not been executed in accordance with the methods and materials designated in the Contract Documents.

3.4.1.1.2 Contract References: Citation of the provision or provisions of the Contract Documents which specify the Work to be executed.

3.4.1.1.3 Time for Compliance. Fixing of a reasonable space of time within which the Contractor shall have made good the deficiency (which said space of time shall not be deemed to be an extension of Contract Time) for filing the Notice of Readiness for Inspection for Material Completion pursuant to Article 6.3.2 nor shall it be deemed to be authorization for amendment to the Overall Project Schedule.

3.4.1.2 Failure to Supply Workmen or Materials or to Prosecute the Work. A Notice of Non-Compliant Work may be issued for failure of the Contractor to supply enough workers or enough materials or proper materials to prosecute the Work. A Notice of Non-Compliant Work in such event may be based on Article 3.3.2 (Competent Management of Time), and upon the definition of Work as set forth under Paragraph 1.1.9.58.

3.4.1.3 Removal and Making Good of Non-Compliant Work. The Contractor shall remove from the Site within the space of time designated in Notice of Non-Compliant Work all work determined by the Design Professional as failing to conform to the contract, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute the work in accordance with the Contract and without expense to the Owner and shall bear the expense of making good all work of other contractors destroyed by such removal or replacement. The Contractor shall supply any omitted work and perform all unexecuted work within the space of time fixed by the Design Professional in Notices of Non-Compliant Work.

3.4.1.4 Remedy of the Owner for Breach of Notice of Non-Compliant Work.

3.4.1.4.1 Failure to Make Good a Deficiency. If the Contractor does not make good a deficiency within a reasonable space of time fixed in a Notice of Non-Compliant Work, the Owner may do any of the following:

(a) Remove the Non-Compliant Work and store it at the expense of the Contractor. If the Contractor does not pay the expenses of such removal and storing within ten days after receipt of written demand of the Owner, the Owner may upon three days' notice in writing to the Contractor sell such materials at private sale or at auction and shall account for the net proceeds thereof after deducting all proper costs incurred by the Owner.

(b) Supply omitted work, perform unexecuted work, or replace and re-execute work not done in accordance with the methods and materials designated in the Contract Documents, and deduct the cost thereof from any payment then or thereafter due the Contractor. The Design Professional shall approve the amount charged to the Contractor.

3.4.1.4.2 Other Remedies. The remedies stated in this article are in addition to the remedies otherwise available to the Owner, do not exclude such other remedies, and are without prejudice to any other remedies. Time limits stated in Notices of Non-Compliant Work are of the essence of the contract. Unless otherwise agreed to by the Owner in writing, the making good of Non-Compliant work shall physically commence at the Site in not more than seven days after receipt of the Notice of Non-Compliant Work, except that in case of emergency correction shall physically commence at the Site at once, and except that the Contractor shall in any event physically commence the correction at the Site early enough to complete within the space of time allowed in the Notice of Non-Compliant Work. The Owner shall give prompt consideration to reasonable requests for delay in commencement of the making good of Notices of Non-Compliant Work. The making good of Non-Compliant work shall be completed within the space of time allowed in the Notice of Non-Compliant Work unless the Contractor shall have requested from the Design Professional an increase in the amount of time allowed and the Design Professional shall have given notice to the Contractor in writing, with copy to the Owner, stating the additional amount of time, if any, allowed.

3.4.1.5 Notice of Correction from Contractor. The Contractor shall give prompt notice in writing to the Design Professional, with copy to the Owner, upon completion of the correction of the Non-Compliant work. In the absence of such notice, it shall be and is presumed under this Contract that there has been no correction, supplying remedy, or performance of unexecuted work.

3.4.1.6 The Owner's Right to Correct Work. If the Contractor should neglect to prosecute the Work properly or fail to correct Non-Compliant Work or fail to perform any provision of this Contract, the Owner, after three days' written notice to the Contractor, may without prejudice to any other remedy he may have (including without limitation remedies against the Contractor's surety), make good the deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor.

3.4.2 Inspections.

3.4.2.1 Access to Work. The Design Professional, the Owner, and their representatives shall have access at all times to the work wherever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and for inspection.

3.4.2.2 Notice of Readiness for Inspection to Design Professional from Contractor Prior to Covering Work. If the specifications, the Design Professional's instructions (either in the specifications or issued later in writing), laws, ordinances or any public authority require any work to be specially tested or approved, the Contractor shall give the Design Professional timely notice in writing of its readiness for inspection. If the inspection is by any authority other than the Design Professional, the Contractor shall give timely notice of the date fixed for such inspection. Inspections by the Design Professional shall be made promptly and, where practicable, at the source of supply.

3.4.2.3 Fire Marshal Inspections.

3.4.2.3.1 General. The State Fire Marshal may make inspections at any time. It shall be the responsibility of the Contractor to request an inspection at eighty percent completion and at 100% completion and to give notice when all items on the 100% inspection report have been completed. Requests shall be in writing with a copy to the Owner and Design Professional.

3.4.2.3.2 Inspections Defined. The basic definitions for eighty percent and 100% inspections are as follows:

(a) Eighty Percent Inspection: The structural components are in place and open for review of the fire safety components. NOTE: Structural components include the following: fire walls, vertical shafts, stairways, smoke stops, hazardous area separation, roof and ceiling assemblies, corridor and door width, and HVAC system.

(b) 100% Inspection: The Contractor has completed all of the items on the eighty percent inspection report and has the certificate of occupancy in hand.

3.4.2.4 False Start. In the event the Contractor shall have issued notice of readiness prematurely, his action shall be deemed to be a "false start." The Contractor shall be liable for the damage resulting from the aforesaid false start, including, but not limited to, the salary, professional fees, and travel and living expenses of the person or parties inconvenienced by the aforesaid false start.

3.4.2.5 Certificate of Occupancy. The Contractor's obligation under the Contract is to install the Work in accordance with the Contract Documents, obtain the Certificate of Occupancy from the State Fire Marshal or his deputy, and forward it to the Design Professional as a part of the final close out procedures. The Design Professional's obligation is to design the Work to comply with the applicable codes and to qualify for a Certificate of Occupancy.

3.4.3 Covering and Uncovering Work.

3.4.3.1 Re-examination or Re-testing of Work Covered Pursuant to Consent of Design Professional. Re-examination or re-testing of questioned Work previously covered pursuant to consent of the Design Professional may be ordered by the Design Professional. If so ordered the Work must be uncovered by the Contractor. The Owner shall pay the cost of re-examination and replacement or of re-testing if such Work is found in accordance with the Contract Documents. The Contractor shall pay such cost if such Work is found not in accordance with the Contract Documents unless the Contractor can show that a Separate Contractor caused the defect in the Work. In that event, the Owner shall pay such cost. Re-examination or re-testing under the terms of this Paragraph applies only to Work that has been covered with consent of the Design Professional. Work covered without consent of the Design Professional must be uncovered for examination as provided below.

3.4.3.2 Re-examination or Re-testing of Work Covered Without Consent of Design Professional. If any Work should be covered without approval or consent of the Design Professional or contrary to any provision of the Contract Documents, such Work must be uncovered for examination by the Design Professional at the Contractor's expense. The Contractor shall be liable for the costs resulting from the aforesaid uncovering, including, but not limited to, the salary, professional fees, and travel and living expenses of the person or parties inconvenienced thereby.

3.4.4 Inspection Does Not Relieve Contractor. Under the Contract Documents, the Contractor acknowledges that it has the responsibility for furnishing all services, labor, supplies, and materials for the entire Work in accordance with such documents. No provisions of this article nor any inspection of the Work by the Owner, representatives of the Owner, the Using Agency, Contract Compliance Specialist, clerk-of-the-works, engineers employed by the Design Professional, representatives of the Design Professional, or the Design Professional shall in any way diminish, relieve, or alter said responsibility and undertaking of the Contractor. Neither shall the omission of any of the foregoing to discover or to bring to the attention of the Contractor the existence of any Work or materials injured or done not in accordance with said Contract Documents in any way diminish, relieve, or alter such obligation of the Contractor nor shall the aforesaid omission diminish or alter the rights or remedies of the Owner as set forth in the Contract Documents. The Contract Compliance Specialist has no power to make decisions, to accept or reject work, or to consent to the covering of Work. The Contract Compliance Specialist owes no duty to the Contractor.

PART 5 – SUBCONTRACTORS, TRADE CONTRACTORS, AND SUPPLIERS,

3.5.1 Subcontractors, Trade Contractors, and Suppliers.

3.5.1.1 Submission of List. Within fourteen days of the Effective Date of the Contract, the Contractor shall submit in writing to the Design Professional a list of the names of Subcontractors that the Contractor intends to employ on the Work. The list of Subcontractors is not submitted for approval but is for the purpose of establishing the following:

3.5.1.1.1 What trades and portions of the work are to be performed under subcontract, and.

3.5.1.1.2 The names of the parties selected by the Contractor to perform work by subcontract, the aforesaid selection being a matter lying solely within the discretion of the Contractor.

3.5.1.1.3 The Contractor shall identify each minority owned and each female owned Trade Contractor and Subcontractor or Supplier performing work on or supplying material to the project.

3.5.1.1.4 By not later than the tenth day of the month following the end of each quarter the Contractor shall submit to the owner a list of all minority and female owned Subcontractors, Trade Contractors, or Supplier performing work on or supplying material to the Project and the amount paid to each for that quarter.

3.5.1.2 No Approval of Subcontractors, Trade Contractors, and Suppliers. Neither the Owner nor the Design Professional undertakes to pass upon or approve any Subcontractor, Trade Contractor, or supplier.

3.5.2 Representation of Contractor. The Contractor represents that the Subcontractors, Suppliers, and Trade Contractors selected by it are reputable, skilled, reliable, competent, qualified in the trade or field in which they are to perform on the Project, and thoroughly familiar with the codes and laws applicable to their work.

3.5.3 Contractor Responsible for Acts and Omissions. The Contractor agrees that he is as fully responsible for the acts and omissions of his Subcontractors, Trade Contractors, Suppliers, and employees, and further of all persons directly or indirectly employed by them, as the Contractor is for the acts and omissions of employees and persons directly employed by the Contractor. The failure of a Subcontractor, Trade Contractor, supplier, or employee to perform shall not be asserted by the Contractor as an excuse for any omission from or noncompliance with requirements of the Contract Documents; nor shall the Contractor be entitled to an extension of time solely because of failure of a Subcontractor, Trade Contractor, supplier, or employee to perform. The subcontracting of work does not relieve the Contractor of the responsibility for the execution of the work and for compliance with all requirements of the Contract Documents. The Contractor shall not assert negligence, inefficiency, insolvency, bankruptcy, or incompetence of any Subcontractor, Trade Contractor, supplier, or employee as excuse for the existence of any noncompliance with or omission to fulfill any obligation under the Contract either as to timely performance or as to compliance with methods and materials designated in the Contract Documents; nor shall the Contractor assert nonperformance of a Subcontractor, Trade Contractor, supplier, or employee as excuse for the existence of any noncompliance with or omission to fulfill any obligation under the Contract. As to Subcontractor, Trade Contractor, supplier, and employees of the Contractor, the doctrine that a principal is liable for the acts and omissions of his agent shall be binding on the Contractor in his relationship to the Owner, and the Contractor may not reverse the aforesaid doctrine by contract or legal mechanism.

3.5.4 No Contract between Owner and Any Subcontractor, Trade Contractor, Supplier, or Employee. Nothing contained in the Contract Documents shall create any contractual relation between the Owner and any Subcontractor, Trade Contractor, Supplier, or employee of the Contractor or its Subcontractors..

3.5.5 Relationship of Contractor With Subcontractors, Trade Contractors, and Suppliers.

3.5.5.1 Obligations of Each. The Contractor agrees to bind every Subcontractor, Trade Contractor, Supplier (hereinafter collectively referred to as "Subordinate Contractor") to the terms of the Contract Documents insofar as they are applicable to its work, including the following provisions of this Article:

3.5.5.1.1 The Contractor Agrees:

(a) To be bound to the Subordinate Contractor by all the obligations that the Owner owes to the Contractor under the Contract Documents.

(b) To pay the Subordinate Contractor upon the payment of certificates issued under the schedule of values described in the General Conditions the amount allowed to the Contractor on account of the Subordinate Contractor's work to the extent of the Subordinate Contractor's interest therein within seven days of receipt of payment from the Owner; provided, however, that retainage shall be released to the Subordinate Contractor as provided by law and in accordance with the statutory affidavit set forth in Section 7, Forms.

(c) To pay the Subordinate Contractor upon the payment of certificates issued otherwise than the schedule of values such manner that at all times the Subordinate Contractor's total payments shall be as large in proportion to the value of the work done by the Subordinate Contractor as the total amount certified and paid to the Contractor is to the value of the work done by the Subordinate Contractor.

(d) To pay the Subordinate Contractor a just share of any property insurance money received by the Contractor and due to Subordinate Contractor for work performed by Subordinate and paid for by insurance.

(e) That no claim for services rendered or materials supplied or other matters by the Contractor against the Subordinate Contractor shall be valid unless written notice thereof is given by the Contractor to the Subordinate Contractor prior to or during the first ten days of the calendar month following that in which the Contractor determines that the claim is chargeable against that Subordinate Contractor.

(f) To give the Subordinate Contractor, upon its request, an opportunity to be present with Contractor and to submit evidence in any dispute involving rights of the Subordinate Contractor.

3.5.5.1.2 The Contractor Agrees to require its Subcontractors to do the following:

(a) To be bound to the Contractor by the terms of the Contract Documents and to assume toward the Contractor all the obligations and responsibilities that the Contractor by the aforesaid documents assumes toward the Owner.

(b) To submit to the Contractor applications for payment in such reasonable time as to enable the Contractor to apply for payment under these General Conditions.

(c) To make all claims for extras, for extensions of time or for damages to the Contractor in the manner provided in the General Conditions for like claims by the Contractor upon the Owner, except that the time for making such claims to the Contractor is within ten days after the initial event leading to the claim.

(d) To pay their Subordinate Contractors upon the payment of certificates issued under the schedule of values described in the General Conditions the amount allowed on account of such Subordinate Contractor's work to the extent of such Subordinate Contractor's interest therein within seven days of its receipt of payment; provided, however, that retainage shall be released as provided by law and in accordance with the statutory affidavit set forth in Section 7, Forms.

(e) To pay their Subordinate Contractors upon Subcontractor's receipt of payment such that at all times their Subordinate Contractors' aggregate payments shall be in proportion to the Work performed by each of the Subordinate Contractors.

3.5.5.2 Owner Not Obligated to Any Subcontractor, Subordinate Contractor, Trade Contractor, or Supplier. There is no obligation on the part of the Owner to pay to or to see to the payment of any sums to any

Subcontractor, Subordinate Contractor, Trade Contractor, Supplier, laborer, employee, or person supplying labor, materials, machinery or equipment to the Project.

3.5.5.3 Term "Substantial Completion" Deleted. The term "substantial completion," if found, is hereby deleted and is of no force in all Subcontracts, Trade Contracts, and in the Trade Sections of the Contract Documents. In certain contexts, the term may be superseded by the term "Material Completion" as defined in this Contract.

3.5.5.4 Failure to Incorporate Terms in Subcontracts. The Contractor agrees that failure on his part to incorporate this Article 3.5.5 in all Subcontracts, Trade Contracts, or Supplier contracts, is a material breach of an essential covenant of this Contract, and further agrees that in the event of such breach the Contractor shall, within five days after demand of the Owner, furnish proof in writing that the deficiency has been remedied to the end that (1) the Contractor may not maintain that it is beyond his competence to require performance of terms of the contract by a subcontractor and (2) no subcontractor may maintain that he has not assumed toward the Contractor all the obligations and responsibilities that the Contractor has assumed toward the Owner. Failure on the part of the Contractor to effect remedy as above within five days after receipt of written demand of the Owner shall be grounds for issuance of a declaration of default by the Owner.

SECTION 4 – COMPENSATION

PART 1 - GENERAL

4.1.1 Payments. The Owner will make progress payments to the Contractor in accordance with Section 4 of the General Conditions. Final Payment will be made in accordance with Section 6 of the General Conditions. The date and amount of payment are subject to Section 4, Part 2. Sums retained by the Owner remain the property of the Owner until such time as the Contractor shall have become entitled to receive such payment pursuant to Section 6 of the General Conditions by furnishing the remainder of the Work and services required by the Contract Documents.

4.1.2 Application for Payments.

4.1.2.1 Form of Application. The Contractor shall periodically submit to the Design Professional an Application for Payment on the form set forth in Section 7 (sometimes called a "Periodical Estimate") for each payment requested, and, if requested by the Owner or Design Professional, shall attach backup materials including, but not limited to, receipts or other vouchers, showing his payments for materials and labor, including payments previously made to Subcontractors.

4.1.2.2 Initial Breakdown and Periodical Payments. Each Application for Payment shall be submitted at least ten days before each payment falls due, and the Contractor shall, before the first application, shall submit to the Design Professional a Schedule of Values of the various parts of the work, including quantities, aggregating the total sum of the Contract, divided in the same manner set forth in the Application for Payment Form set forth in Section 7 showing the Contractor's right to the payment claimed and so arranged and so itemized as to meet the approval of the Design Professional and, further, if requested, supported by such evidence as to its correctness as the Design Professional may direct.

4.1.2.3 Materials Stored. If the Application for Payment includes materials delivered and suitably stored at the Site but not incorporated in the work, they shall, if required by the Owner or the Design Professional, be conditional upon submission by the Contractor of bills of sale or such other procedure as will establish the Owner's title to such material or otherwise adequately protect the Owner's interest. The Contractor is responsible for the existence, protection, and, if necessary, replacement of materials until execution of the Final Certificate of the Design Professional. The Owner shall not pay for any materials stored off-site.

4.1.2.4 Retainage.

4.1.2.4.1 Withholding of Retainage; Conversion to Lump Sum. Retainage shall be withheld from each periodic payment to the Contractor in the amount of ten percent of the sum of the total amount earned for work–in-place (original Contract), total amount earned for work-in-place (Change Orders), and Value of Materials stored at the Site. After one-half of the Contract Sum, including Change Orders, becomes due and the Work meets all of the following conditions:

(a) On or ahead of the Overall Project Schedule; and
(b) There are no breaches of Notices of Non-Compliant Work; and
(c) There is no delinquency in the completion of work and filing of the final breakdown and accounting pursuant to any Change Orders utilizing a Force Account;

then, if the Contractor requests and the Design Professional approves in writing, the sum being withheld as retainage will be converted to a lump sum and held by the Owner until Material Completion.

4.1.2.4.2 Reinstatement of Retainage. The Owner will withhold no further retainage from payments to the Contractor unless one or more of the following events occur:

(a) The percentage of work complete falls behind the percentage required by the Overall Project Schedule by as much as five percent; or
(b) The Contractor breaches a Notice of Non-Compliant Work; or
(c) The Contractor becomes delinquent in regard to the filing of the final breakdown and accounting pursuant to any Change Orders utilizing a Force Account;

in which event or events the Owner shall reinstate the ten percent retainage on all Applications for Payment due to be paid while one or more of the events continues to exist. The Contractor will be given written notice of the reinstatement of the retainage.

4.1.2.4.3 Reconversion to Lump Sum. If the Contractor subsequently:

(a) Recovers all lost time and puts the work back on schedule; and
(b) Remedies all breaches of Notices of Non-Compliant Work; and
(c) Supplies a proper breakdown and accounting pursuant to any Change Orders utilizing a Force Account;

then the sums withheld while either or all of the events existed will be again converted to a lump sum.

4.1.2.5 Subcontractor's Retainage Release**.** At the discretion of the Owner and request by Contractor, an amount equal to the subcontract retainage of a Subcontractor may be separately released from the retainage held by the Owner as he completes his work. An application in accordance with the Owner's specimen (See Section 7, Forms) for release of a Subcontractor's retainage shall contain a release of all claims by the Subcontractor and shall bear the original certificates of the Subcontractor, the Contractor, and the Design Professional that the Subcontractor's work has been fully performed and that the sum for which payment is requested is due by the Contractor to the Subcontractor. Checks releasing a Subcontractor's retainage shall be made payable to the Contractor, the Contractor's surety, and the Subcontractor and shall be mailed to the Contractor's surety. This article does not create any contractual relationship between the Owner and the Subcontractor or any duty of the Owner to any Subcontractor.

4,1.2.6 Accounting Format. Applications for Payment shall be broken down by CSI Category and, in certain situations, by CSI Description and capital asset category, as set forth in the form for Application for Payment. The purpose is to provide appropriate backup documents for the Contractor's Final Certification of Costs in conformance with GASB 34 accounting standards. *See* Section 7 – Forms, "Application for Payment" and Final Certification of Costs.

4.1.3 Processing of Application for Payment (Periodical Estimates). The Contract Compliance Specialist (CCS) will review the Application for Payment prepared and executed by the Contractor and, if he concurs, execute a certificate on the face of the Application for Payment as to its accuracy. The Design Professional shall visit the Site after the Contractor and CCS have agreed on the Application for Payment and conduct such inspections and reviews as are necessary to make a decision as to the accuracy of the Application for Payment. If the CCS and the Contractor cannot agree on the appropriateness of the Application for Payment in question, the Design Professional shall make a decision. Upon determining the appropriateness of the Application, the Design Professional shall execute the certificate on the Application for Payment and forward it to the Owner for payment. Not later than seven days after receipt of the Application for Payment, the Design Professional shall issue its certificate for such amount as it decides to be properly due or state in writing its reasons for withholding any sums in its certificate.

4.1.4 Effect of Design Professional's Certificate on an Application for Payment. No certificate issued by the Design Professional, nor payment made to the Contractor by the Owner, or partial or entire use or occupancy of the Work by the Owner shall be an acceptance of any work or materials not in accordance with the Contract Documents.

4.1.5 Payment Due. Payment of an Application for Payment shall be due ten days after receipt by the Owner of the certification of the Application for Payment by the Design Professional.

4.1.6 Payment Due Dates and Interest. Should the Owner fail to pay a proper invoice within thirty calendar days of receipt, the Contractor shall notify the Owner in writing by certified or statutory mail. If the Owner fails to pay within five business days of receipt of the notice, the Contractor shall receive, in addition the sum named in the proper invoice, interest thereon at the rate of one half percent per month on the unpaid balance as may be due.

4.1.7 Payments for Change Order Work. Payments will not be made for any changes in the Work until a Change Order has been executed.

PART 2 – PAYMENTS WITHHELD

4.2.1 Payments Withheld.

4.2.1.1 Payments Withheld or Nullified. The Design Professional or the Owner may withhold or, on account of subsequently discovered evidence, nullify the whole or a part of any certificate to such extent as may be necessary to protect the Owner from loss because of the following conditions:

(a) Defective work not remedied.
(b) Claims or liens filed
(c) Failure of the Contractor to make payments properly to Subcontractor or Supplier for materials or labor.
(d) A reasonable doubt that the Contract can be completed for the balance then unpaid.
(e) Damage to a Separate Contractor or to the Owner or a third party.
(f) Failure to maintain a rate of progress consistent with the Milestones.
(g) Failure to supply enough skilled workers or proper materials.
(h) Court-ordered retention.
(i) State Tax Forms not on file.
(j) Breach of this Contract

4.2.1.2 Withheld Payments Restored. When the conditions above are remedied, payment shall be made for amounts withheld because of them.

PART 3 - LIENS

4.3.1 Public Property Not Subject to Lien. The Contractor acknowledges that, pursuant to law, the Site is public property of the State of Georgia and is not subject to lien or levy. The Contractor will notify the Owner of any liens or levies against the Site of which it becomes aware. The Contractor shall cooperate with the Owner and shall use its best efforts to assist in securing the release of any liens or levies of which it becomes aware.

4.3.2 Notice of Commencement. A Notice of Commencement shall be filed by the Contractor with the Clerk of the Superior Court in the county in which the Project is located, pursuant to O.C.G.A. §13-10-62.

4.3.3 Release of Liens. Neither any part of the retainage nor the Final Payment shall become due until the Contractor, if required, shall deliver to the Owner a complete release of all liens or conditional release of lien upon payment or claims arising out of this contract in accordance with the Owner's specimen form (a copy of which will be provided to any bidder on request), or receipts in full in place thereof and, if required in either case, an affidavit that so far as he has knowledge or information the releases and receipts include all labor and materials for which a lien or claim could be filed; but the Contractor may, if any Subcontractor or claimant refuses to provide a release, furnish a bond satisfactory to the Owner to indemnify the Owner against any lien or claim. If any lien or claim remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such lien or claim, including all costs and reasonable attorney's fees.

SECTION 5 – CONTRACT ADJUSTMENTS, DISPUTES, AND TERMINATION

PART 1 – OWNER'S RIGHT TO SUSPEND OR STOP WORK

5.1.1 Owner's Right to Suspend Work. The Owner reserves the right, with or without the concurrence of the Design Professional, to suspend the Work at any time or from time to time at the Owner's sole discretion, upon giving Contractor five days advanced written notice thereof. If the Owner exercises this right and then resumes the Work covered hereby, Contractor shall be entitled upon timely claim to a Change Order for payment by Owner of any reasonable Actual Costs actually incurred by Contractor in connection with the suspension and resumption of the Work, as well as an extension in the time for performance of the Work to the extent Contractor is delayed by Owner's suspension, to include compensation based upon the rate for Time Dependent Overhead Costs. The Design Professional shall determine the time, which shall be binding upon both Owner and Contractor, as set forth in Section 3, Part 3.

5.1.2 Owner's Right to Stop Work. The Owner reserves the right, for itself and for any designated Construction Inspector retained by Owner, upon observation of apparent nonconforming Work, to immediately stop the affected Work. If the Work is later determined by the Design Professional to be in fact conforming Work, then Contractor shall be entitled upon timely claim to a Change Order for payment by Owner of any reasonable Actual Costs actually incurred by Contractor in connection with the stop Work order and resumption of the Work, as well as an extension in the time for performance of the Work to the extent Contractor is delayed by Owner's stop Work order. The Design Professional shall determine the time, which shall be binding upon both Owner and Contractor, as set forth in Section 3, Part 3.

5.1.3 Owner's Rights Independent from Rights and Duty of the Design Professional. The rights granted to Owner under this Article are independent of the duty and obligation of the Design Professional to stop the Work for non-compliant work or to issue Notices of Non-Compliant Work.

PART 2 – CONTRACT ADJUSTMENTS AND DISPUTES

5.2.1 General Provisions.

5.2.1.1 No Arbitration. There is no agreement to arbitrate any dispute arising under the Contract Documents. Any and all references to arbitration in any of the Contract Documents, including without limitation any exhibits, attachments or references, are hereby deleted and rendered null and void.

5.2.1.2 Continuation of the Work. Unless otherwise agreed in writing, and notwithstanding any other rights or obligations of either of the parties under any Contract Documents or Contracts, the Contractor must carry on with the performance of its contract services and the Work, including all duties and obligations hereunder, during the pendency of any Claim, dispute, and other matter in question or during any alternative dispute resolution proceeding, court proceeding, or other proceeding to resolve any Claim, dispute, and other matter in question, and the Owner will continue to make payments in accordance with the Contract Documents. The Owner, however, is under no obligation to make payments on or against such Claims, disputes, and other matters in question during the time required to resolve such Claims, disputes, and other matters in question.

5.2.2 General Claims for Contract Adjustments and Disputes.

5.2.2.1 General Claims of the Contractor. Should the Contractor suffer any injury or damage to person or property that Contractor reasonably believes a legal basis exists for liability on the part of the Owner, Program manager, or Design Professional, and that should result in an adjustment in the Cost of the Work or the Contract Time, such claim shall be made in writing in the form of a Request for Change Order to the Design Professional and copy the owner within fourteen days after such injury or damage is or has been observed. Any and all claims not made within said fourteen days are barred, waived, released, and discharged. The decision of the Design Professional is final and binding on the Contractor unless the Contractor protests the decision of the Design Professional and files a Statement of General Claim as set forth below.

5.2.2.2 Processing of General Claims. All claims must be filed and processed as a request for Change Order and subject to the processes and limitations set forth in Section 3 Part 2. If the requested Change Order is rejected, a protest may be made as set forth in Paragraph 5.2.2.3 below.

5.2.2.3 Protest; Statement of General Claim; Time of Submission. No protest of a claim decision of the Design Professional by the Contractor, whether said claim shall be accrued or prospective, shall be valid unless a "Statement of Claim" in writing and accompanied by vouchers and other supporting data shall have been filed with the Owner's Representative, or if there is no Owner's Representative, with the Owner by the Contractor not later than thirty days after the Design Professional's decision to reject the claim, time being of the essence. The "Statement of Claim" shall contain a concise and clear recital of the grounds and the legal basis upon which the claim is asserted, including a designation of the applicable provisions of the Contract Documents. The Statement of Claim shall indicate the dollar amount of the claim and the number of days of adjustment of the Contract Time. The Owner and Contractor shall endeavor to resolve the dispute in accordance with Article 5.2.3 below.

5.2.2.4 Claims by Subcontractors. No claim or protest shall be made by the Contractor solely on the ground that a Subcontractor, Supplier, or Trade Contractor has made a claim or protest against the Contractor. The Contractor must maintain its claim or protest against the Owner based upon the provisions of the Contract Documents and independent of any right the Subcontractor, Supplier, or Trade Contractor has against the Contractor. The Contractor shall defend the Owner from any claims or protests submitted by a Subcontractor, Supplier, or Trade Contractor asserted in violation of, or contrary to any provision of the Contract Documents.

5.2.3 Dispute Resolution.

5.2.3.1 Initial Dispute Resolution. If a dispute arises out of or relates to this Contract or its breach, the parties shall endeavor to settle the dispute first through direct discussions between the parties' representatives who have the authority to settle the dispute. If the parties' representatives are not able to promptly settle the dispute, they shall refer the dispute to the senior administrators of the parties who have the authority to settle the dispute, who shall meet within fourteen days thereafter. If the dispute is not settled by the senior administrators, the parties may submit the dispute to mediation in accordance with Paragraph 5.2.3.2.

5.2.3.2 Mediation. If the dispute cannot be settled pursuant to Paragraph 5.2.3.1, the parties may elect to submit the dispute to mediation. The parties agree to conclude such mediation within sixty days of electing

mediation. The parties shall select a mutually agreeable mediator and shall share the cost of the mediator equally. Either party may terminate the mediation at any time after the first session, but the decision to terminate shall be communicated directly by the party's representative to the other party's representative and the mediator.

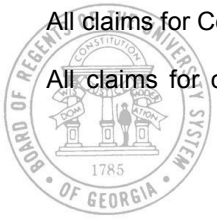
5.2.3.3 Multiparty Proceeding. All parties necessary to resolve a claim shall be parties to the same dispute resolution proceeding and shall share the costs equally. Appropriate provisions shall be included in all other contracts relating to the Work to provide for the consolidation of such dispute resolution procedures.

5.2.3.4 No Litigation. No litigation may be commenced without first following the process in this Article. Action may be filed in the Superior Court in Fulton County, Georgia, pursuant to OCGA §50-21-1, after the filing party provides thirty days written notice to the opposing party.

5.2.4 Certain Claims Excluded from General Claims.

5.2.4.1 All claims for Compensable Delay under Article 3.3.8.

5.2.4.2 All claims for changes to the Work under Article 3.2.12, Article 3.2.13, Article 3.2.14, and Article 3.2.16.



PART 3 - TERMINATION

5.3.1 Owner's Right to Terminate Contract for Convenience.

5.3.1.1 Termination for Convenience. The Owner may at any time, and for any reason or without any reason or cause, terminate this Contract by written notice to the Contractor specifying the termination date, without cause and irrespective of whether or not Contractor is in default of any of its obligations hereunder. The effective date of termination shall not be earlier than seven days from the date of confirmed receipt of the written notice.

5.3.1.1.1 The Contractor shall: (i) stop the Services or the Work (as applicable); (ii) place no further orders or Subcontracts for materials, labor, services or equipment; and (iii) terminate all material and equipment orders and Subcontracts to the extent terminable (unless otherwise directed by Owner in writing) and advise Owner of all materials, equipment and other items which cannot be canceled or which are already delivered and allow Owner to participate in the salvage or disposition thereof.

5.3.1.1.2 If Owner terminates this Contract pursuant to this Section prior to the commencement of the Construction Stage, Contractor shall, as soon as practical after receiving notice of termination under Section 5.3.1.1, submit to Owner an Application for Payment for all services performed through the date of receipt of the notice of termination, for which payment has not been previously made pursuant to the terms of this Contract.

5.3.1.1.3 If Owner terminates this Contract pursuant to this Section after commencement of the Construction Stage, Contractor shall, as soon as practical after receiving notice of termination under Section 5.3.1.1, submit to Owner an Application for Payment showing all of the costs incurred by Contractor in the performance of the Work terminated through the date of receipt of the notice of termination. The phrase "costs incurred by Contractor in the performance of the Work terminated" as used herein shall be deemed to include:

(i) Subcontract costs of Work completed;
(ii) Cancellation fees in regard to equipment and materials ordered;
(iii) Cost of all materials and equipment ordered which cannot be cancelled; less actual proceeds received upon the disposition thereof;
(iv) Field Work accomplished;
(v) Permit, engineering, bond and inspection fees;
(vi) All other direct costs actually incurred by Contractor that can be demonstrated by invoice, canceled check, or other appropriate documentation;
(vii) General Conditions costs and profit incurred through the date of termination.
(viii) Job Site and termination costs for ten business days after the date of termination to be paid at the daily rate Time Dependent Overhead Costs.

5.3.1.2, Acceptance of payment by the Contractor shall constitute a waiver of all further claims by Contractor against Owner under the Contract, and shall be Contractor's exclusive remedy for termination of the Contract.. Notwithstanding anything to the contrary contained in the Contract Documents, in no event shall Contractor be entitled to any payment on account of accident or lost profits or consequential damages in connection with any termination of the Contract, or otherwise in connection with the Contract.

5.3.1.3 Condition Precedent to Payment. As a condition precedent to receiving the payment set forth in this Article 5.3.1, Contractor shall deliver to the Owner all papers, documents, assignments and agreements relating to the Project, in particular the Contract Documents (including ownership and copyright thereof) as set forth in Article 1.1.7, Paragraphs 1.1.9.17 and 2.2.1.8.

5.3.1.4 Assignment of Rights, Trade, and Subcontracts.

5.3.1.4.1 Assignment. If requested, Contractor shall assign to the Owner or to an entity of Owner's choice any or all of Contractor's contractual rights in respect thereof, so that the assignee shall be fully vested with all rights and benefits of Contractor under such papers, documents and agreements, together with releases and waivers of lien in the same manner as would be required upon Final Completion. The Owner may also request the assignment from Contractor to Owner or to the entity of Owner's choice of any or all Subcontractors and supplier agreements entered into by Contractor and in that event the assignee shall be solely obligated to the Subcontractors and Suppliers under such contracts or agreements for all sums payable thereunder and not previously paid by the Owner to Contractor.

5.3.1.4.2 Cessation of Entitlement. Upon the Contractor's assignment of agreements, contracts, Trade Contracts and/or Owner's payment of monies due Contractor as provided in Subparagraph 5.3.1.4.1 above, Contractor shall be entitled to no further compensation of any kind from Owner and shall have no further obligation with regard to the assigned agreements, contracts, Subcontractors or Supplier.

5.3.2 Owner's Right to Declare Default and/or Terminate Contract for Cause.

5.3.2.1 Termination for Cause. In the event that any provisions of this Contract are violated by the Contractor, through its own forces or by any of its subcontractors, the Owner may serve written notice upon the Contractor and the surety of the Owner's intention to declare default and terminate the Contractor. Unless within ten days after the serving of such notice upon the Contractor, such violation or delay shall cease and satisfactory arrangement of correction be made, the Contractor shall, upon the expiration of said ten days, be in default. Such notices shall outline the reasons for such intention to terminate the contract. In the event of any such default, the Owner shall immediately serve notice thereof upon the surety and the Contractor, and the Owner shall demand that the surety perform in accordance with its bond. If the surety fails to exercise its election under the bond or does not commence performance thereof within the time required by the bond, the Owner may take over the Work and prosecute the same to completion for the account of and at the expense of the Contractor. The Contractor and its surety shall be liable to the Owner for any excess cost to the Owner. The Owner may take possession of and utilize in completing the Work such materials, appliances, and plant as may be on the Site and necessary thereto.

5.3.2.2 Grounds for Issuance of Notice of Declaration of Default. It shall be a sufficient ground for the issuance of a notice of declaration of default that the Contractor has been unfaithful or delinquent in the performance of the Contract or any part of it in any respect. The Design Professional does not have authority to declare the Contractor in default.

5.3.2.2.1 Non-Compliant Work. Without limitation of the foregoing and without subtracting from any right or defense of the Owner under other provisions of the Contract Documents, the Contractor acknowledges and agrees that it is grounds for issuance of a notice of declaration of default under the performance bond if the Contractor shall have neglected or failed for any reason to remedy a breach of a Notice of Non-Compliant Work within thirty days after the Owner shall have given written notice of said breach to the Contractor.

5.3.2.2.2 Failure to Prosecute the Work. If the Contractor refuses or fails, except in cases for which extensions of time are provided, to supply enough properly skilled workmen or proper materials, or if it fails to make proper payment to Subcontractors for materials or labor, or if it fails to diligently prosecute the Work in accordance with the Contract Documents, then the Owner may, without prejudice to any right or remedy and after giving the Contractor and its Surety, after ten days' written notice of the Owner's Intent to Declare Default, during which period the Contractor fails to cure or fails to commence and thereafter diligently prosecute Work necessary to cure the violation, declare the Contractor to be in default.

5.3.2.2.3 Other Failures of the Contractor. If Contractor, without limitation, makes a general assignment for the benefit of its creditors, or if a receiver is appointed on account of its insolvency, or if it persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction over the Project, or if it otherwise is guilty of a violation of any provision of this Contract, then the Owner may, without prejudice to any right or remedy and after giving the Contractor and its Surety, if any, ten days written notice of the Owner's Intent to Declare Default, during which period the Contractor fails to cure or fails to commence and thereafter diligently prosecute Work necessary to cure the violation, declare the Contractor to be in default.

5.3.2.3 Owner's Right to Prosecute the Work. Time being of the essence, if the Contractor shall be declared in default, both the Contractor and the Surety agree that the Owner may, after giving the Contractor and Surety the required notice and time under the bond if any is required, without prejudice to any other remedy and without invalidating the performance bond, make good such deficiencies and may deduct the cost thereof from payment due the Contractor or, at the Owner's option and without prejudice to the Owner's rights against the Contractor and Surety, the Owner may terminate the Contractor and take possession of the Site and of all materials, equipment, tools and construction equipment and machinery thereon owned by the Contractor and finish the Work by whatever method the Owner shall deem expedient.

5.3.2.4 Effect of Later Determination. In the event the parties agree or a court of competent jurisdiction determines (or the parties agree to settle with a consent determination) that a default is wrongful or not the fault of the Contractor, the termination shall be considered to be a Termination for Convenience and the sole remedy available to the Contractor shall be the contractual treatment of the termination pursuant to Article 5.3.1 above and without any other damages or relief.

5.3.3 Contractor's Right to Terminate.

5.3.3.1 Contractor's Right to Stop Work. The Contractor may, upon seven days written notice to the Owner and the Design Professional, stop Work without penalty for the following reasons:

5.3.3.1.1 Order of Court or Superior Public Authority. If any court or other superior public authority issues an order that affects the Work and the order results from no act or fault of the Contractor, the Contractor may stop the affected Work. In addition, the Contractor may stop Work as a result of an act of government, such as a declaration of a national emergency, making critical materials unavailable.

5.3.3.1.2 Failure to issue Certificate of Payment. Work may be stopped if the Design Professional should fail to certify any Application for Payment within fourteen days after said certification is due from the Design Professional. This ground terminates upon any payment of the Application for Payment by the Owner.

5.3.3.2 Contractor's Right to Terminate Contract.

5.3.3.2.1 Contractor's Right to Terminate for Nonpayment. If the Owner fails to pay the Contractor when payment is due, the Contractor must give written notice of the Contractor's intention to terminate this Contract. If the Owner fails to provide the Contractor payment or written notice of a dispute as to the amount sought by the Contractor within thirty days after receipt of the Contractor's written notice, the Contractor may terminate this Contract. Upon such termination the Owner will pay the Contractor for the Work properly executed to date, and, upon timely claim therefore, for any proven loss sustained or cost incurred upon any materials, equipment, tools, construction equipment and machinery, and cancellation charges on existing obligations of the Contractor.

5.3.3.2.2 Contractor's Right to Terminate after Stopping Work. After stopping its Work in accordance with Paragraph 5.3.3.1 above, the Contractor may, upon thirty days written notice to the Owner and the Design Professional, terminate this Contract and recover from the Owner payment for all Work executed and any proven loss sustained or incurred upon any plant or any materials, equipment, tools, construction equipment and machinery, and cancellation charges on existing obligations of the Contractor, if the grounds for stopping the Work are not removed**.**

5.3.4 Limitation on Payments. For terminations pursuant to Article 5.3.2 and 5.3.3, the Contract Sum shall be deemed earned only to the extent of an amount that bears to the total Contract Sum the same ratio that the Work in place

at the time of termination bears to the total Work, as reasonably determined by the Design Professional, and approved by the Owner.

5.3.5 Termination by Owner for Abandonment by Contractor. Both the Contractor and the Surety agree that, after fourteen calendar days' written notice to the Contractor, the Owner may terminate the Contractor if the Contractor abandons the Project. If such termination occurs, the Owner shall credit the Contractor for Work satisfactorily completed, less any costs and liquidated damages the Owner suffers in correcting the Work, re-contracting and starting-up a replacement contractor, and completing the Project, including all warranties.

5.3.6 Notices of Termination. Notwithstanding any other provision of this Contract, no party may terminate this Contract, regardless of reason, unless the terminating party shall first issue a written Notice of Termination or of Default to the terminated or defaulted party by Statutory Mail or Certified Mail, Return Receipt Requested.

SECTION 6 - PROJECT COMPLETION

PART 1 – MATERIAL COMPLETION

6.1.1 Material Completion.

6.1.1.1 Material Completion Defined. Material Completion is when the Work or designated portion thereof is complete in accordance with the Contract Documents so that the Owner and its Using Agency can occupy and utilize the Work for its intended use. Material Completion shall include issuance of any required Health Department inspections and any necessary certificates to operate, certificate of occupancy, as well as complete operation of all applicable building systems including, but not limited to, mechanical, electrical, plumbing, fire protection, fire alarm, security, elevators, life safety, and accessibility. Material Completion occurs when the Work is complete, except for Minor Items or Permitted Incomplete Work or Warranty Complaint Items (see Article 6.6.3), and a Certificate of Material Completion is obtained.

6.1.1.1.1 Material Completion and Occupancy Date. The date designated in the Contract for Material Completion to be achieved.

6.1.1.1.2 Minor Item Defined. A Minor Item is a portion or element of the Work—

(a) that can be totally complete within thirty days; and
(b) that can be completed while the Using Agency occupies the Work without impeding or interfering with either the Using Agency's use and occupation of the Work or the Contractor's ability to complete the Minor Item; and
(c) that will not interfere with the complete use and enjoyment of the project by the Using Agency.

6.1.1.1.3 Permitted Incomplete Work Defined. Permitted Incomplete Work is work that is incomplete through no fault of the Contractor, as determined by the Owner, including, but not limited to, seasonal test and balance, seasonal landscaping, scheduled elevator inspection or maintenance, incomplete work due to failure of Separate Contractors to complete work, and the like.

6.1.1.2 When Material Completion Required. Material Completion shall be achieved within the Contract Time and by the Material Completion and Occupancy Date, as amended. Failure by the Contractor to achieve Material Completion by not later than the Material Completion and Occupancy Date, as amended, shall be sufficient cause for the assessment of Liquidated Damages.

6.1.2 Effect of Achieving Material Completion. Upon the date when Material Completion is actually achieved, the following matters are conclusively determined:

6.1.2.1 Occupancy of the Work. The Using Agency may immediately occupy the Work without restriction.

6.1.2.2 Warranty Periods. All warranties begin to run from the date Material Completion is achieved.

6.1.2.3 Utilities. All utilities become the responsibility of the Using Agency.

6.1.2.4 Insurance. The Using Agency is responsible for all insurance for the Project.

6.1.2.5 Liquidated Damages. The Liquidated Damages daily rate is reduced to zero.

6.1.2.6 Payment for Material Completion. The Contractor may request payment of the remaining contract balance, including retainage, less the amounts credited the Owner or incurred as Liquidated Damages, and less the amounts withheld for the punchlist by reason of Minor Items or Permitted Incomplete Work. See Paragraph 6.5.3.2.

6.1.3 Effect of Failure to Achieve Material Completion. Should Material Completion not be achieved by the Material Completion and Occupancy Date, as amended, the following matters are conclusively determined:

6.1.3.1 Breach of Contract. As time is of the essence in the completion of the Work, the Contractor is in breach of the Contract and is subject to default.

6.1.3.2 Liquidated Damages. Liquidated Damages at the specified daily rate in the Contract begin to accrue and are payable on the day immediately following the Material Completion and Occupancy Date.

PART 2 – FINAL COMPLETION

6.2.1 Final Completion.

6.2.1.1 Final Completion Final Completion shall be evidenced by the Design Professional's Certificate of Final Completion. Final Completion should include completion of Permitted Incomplete Work, as defined in Section 6, Part 1.

6.2.1.2 When Final Completion Required. Minor Items shall be completed as expeditiously as possible, but not later than thirty days after Material Completion of the Work. Permitted Incomplete Work shall be completed as expeditiously as possible, but not later than a date established by the Design Professional. The Design Professional's Certificate of Final Completion shall not be issued until all Minor Items and Permitted Incomplete Work are completed.

6.2.1.3 Deductions for Uncorrected Work. If the Design Professional and Owner deem it inexpedient to correct work not done in accordance with Contract Documents, a deduction from the Contract Sum may be made; but there is no duty on the part of the Owner to accept any work not done in accordance with the Contract Documents.

6.2.2 Effect of Achieving Final Completion. Upon the date when Final Completion is achieved and the Design Professional's Certificate of Final Completion is issued, the following matters are conclusively determined:

6.2.2.1 Project Completion. The Project and the Work are complete.

6.2.2.2 Payment for Final Completion. All amounts withheld from Payment for Material Completion and not previously paid to the Contractor or credited to the Owner, as set forth in Section 6, Part 4, are payable upon receipt of a final pay request from the Contractor.

6.2.3 Effect of Failure to Achieve Final Completion. Should Final Completion not be achieved within the time specified, as amended, the Owner may issue to the Contractor a fourteen-day notice as a final warning to complete the Work. If Final Completion is not achieved by the end of the fourteenth day from the date of the Notice, the following matters are conclusively determined, subject to any request for extension of time as set forth in paragraph 6.2.3.3 below:

6.2.3.1 Breach of Contract. As time is of the essence in the completion of the Work, the Contractor is in breach of the Contract and is subject to default.

6.2.3.2 Ineligibility to Bid Upon State Contracts. The Contractor is ineligible to bid or propose on any contract of the Owner, the Georgia State Financing and Investment Commission, the Board of Regents of the University System of Georgia or any unit of the University System of Georgia, or the Georgia Department of Administrative Services. In the event a bid has been submitted but the bid award has not been made, the Contractor's ineligibility requires that its bid be rejected.

6.2.3.2.1 Automatic Restoration of Eligibility to Bid. The Contractor's eligibility to bid upon state contracts shall be restored automatically as of the date of achievement of Final Completion as evidenced by the Certificate of Final Completion.

6.2.3.2.2 Application to Reinstate Eligibility to Bid. If the Contractor never achieves Final Completion, the Contractor's eligibility to bid or propose on state contracts may be reinstated upon the following:

(a) Not earlier than eighteen months after the date of failure to achieve Final Completion, a written application requesting reinstatement of eligibility to one of the following: the Director, Construction Division, GSFIC; the Vice Chancellor for Facilities, Board of Regents; or the Commissioner, Department of Administrative Services; and
(b) The showing of good and just cause to believe that the actual achievement of Final Completion was impossible, or the showing of other good and just cause that the Contractor's eligibility should be reinstated.
(c) The Contractor may request a personal presentation in the application.

6.2.3.3 Extension of Time for Final Completion. The Contractor may file a request for an additional extension of time in the manner prescribed in Section 3, Part 3, and the effects of Failure to Achieve Final Completion shall be suspended until the Design Professional's decision. Should the Design Professional grant the application for extension of time generally, the time for achieving Final Completion shall be adjusted accordingly. Should the

Design Professional grant the application for extension of time for a specific item of Work, that item of Work shall be deemed Permitted Incomplete Work with a specific individual final completion date.

PART 3 – INSPECTIONS FOR COMPLETION OF THE WORK

6.3.1 General Responsibility of the Contractor for Inspection. The Contractor acknowledges and agrees that it has an indivisible, non-delegable, and nontransferable contractual obligation to the Owner to make its own inspections of the Work at all stages of construction; and it shall supervise and superintend performance of the Contract in such manner as to enable it to confirm and corroborate at all times that all work has been executed strictly in accordance with the methods and materials designated in the Contract Documents. The Contractor's inspections are also for the purpose of permitting the Contractor to accurately represent that (a) its certifications on Applications for Payment are true and correct and (b) its notices of readiness for inspections are true and correct. Accordingly, the Contractor acknowledges and agrees that it may not defend or excuse any deviation from the Contract Documents on the ground (a) that another person or party failed to bring the deviation to its attention, or (b) that any Subcontractor is at fault.

6.3.2 Notice of Readiness for Inspection for Material Completion.

6.3.2.1 Preparation of Initial Punchlist. Prior to the Material Completion and Occupancy Date, as amended, the Contractor shall correct all non-compliant or incomplete work. The Contractor shall then prepare an initial punchlist itemizing to the best of the Contractor's knowledge all Minor Items and Permitted Incomplete Work (as defined in Section 6, Part 1) and provide a copy of the initial punchlist to the Design Professional and Owner. The Contractor is encouraged to consult with the Design Professional prior to finalizing the initial punchlist, in particular in arriving at consensus for Minor Items and Permitted Incomplete Work.

6.3.2.2 Contractor's Notice of Readiness for Inspection for Material Completion. After or simultaneously with the provision of the initial punchlist, the Contractor shall give the Design Professional and Owner written Notice of Readiness for Inspection for Material Completion in the following words:

> *The work on the Contract for the [show name of Project as it appears in the Contract] having been materially completed, I request that the Design Professional perform an Inspection for Material Completion promptly in accordance with Section 6 of the General Conditions. I have attached the initial punchlist.*

6.3.2.3 No Inspection without Notice. No Inspection for Material Completion shall be made until such time as the Design Professional and Owner have received notice in the form indicated above. In the event the Contractor shall have issued the Contractor's Notice of Readiness for Inspection for Material Completion prematurely, the Contractor shall be liable for the damage resulting therefrom, including but not limited to the salaries, professional fees, travel expenses, and living expenses of the persons or parties inconvenienced thereby.

6.3.2.4 Additional Requirements for Inspection for Material Completion. The Contractor shall not request any Inspection for Material Completion before the Contractor has provided to the Design Professional the following:

6.3.2.4.1 a copy of the initial test and balance report on the heating, ventilating, and air conditioning system;

6.3.2.4.2 a copy of the facility operation and maintenance instructions, and any other documents specified by the Design Professional in Division 1 of the Specifications; and

6.3.2.4.3 A certification from the Contractor that all building systems specified in Paragraph 6.1.1.1 above are operational. The Contractor expressly agrees that obtaining the manufacturer's warranties are solely the responsibility of the Contractor. In fulfilling this responsibility, the Contractor shall obtain the manufacturer's certificates in the format specified in Section 7 below, and shall coordinate the initial start-up and testing of building systems. In all cases where the equipment of two or more manufacturers ties in and functions together, the Contractor shall require the manufacturers' field representatives to perform simultaneously the initial start-up, the testing, and the placing of their equipment into operation. "Start-up" is defined as putting the equipment into action. "Testing" is defined as performing such testing as is stipulated in the Contract Documents to be performed. "Placing into operation" is defined as operating the equipment for a sufficient period of time to determine that it is performing properly.

6.3.3 Conducting the Inspection for Material Completion. The Design Professional shall conduct the Inspection for Material Completion within seven days of receipt of the notice specified in Paragraph 6.3.3.2. The Design Professional shall confirm the initial punchlist, shall add or delete Minor Items or Permitted Incomplete Work as appropriate, shall assign values to each item on the punchlist, and shall assign completion dates for the items of Permitted Incomplete Work. At the completion of the Inspection for Material Completion, the resulting punchlist shall be finalized by the Design Professional and provided to the Contractor within five days and shall become the final punchlist. Upon determination of conformity with the definition of Material Completion as specified in Section 6.1.1.1 above, the Design Professional shall issue a Certificate of Material Completion.

6.3.4 Notification of Using Agency of Site Visits by the Contractor or Subcontractors. Following the issuance of a Certificate of Material Completion, the Contractor or its Subcontractors shall not visit the Site without first giving notice to the Using Agency and the Owner.

6.3.5 Contractor's Notice of Readiness for Interim Inspection for Punchlist Completion. Not more than thirty days after Material Completion, and upon completion of the Final Punchlist (including *all* Minor Items and such Permitted Incomplete Items as are due to be completed), the Contractor shall give the Design Professional and Owner written notice requesting Inspection for Final Completion in the following words:

> *The work on the Contract for the [show name of Project as it appears in the Contract] having been 100% completed, except for Permitted Incomplete Work not yet due to be completed, I request that the Design Professional perform an Inspection for Final Completion promptly in accordance with Section 6 of the General Conditions.*

No inspection for Interim Inspection for Punchlist Completion shall be made until the Design Professional and the Owner have received notice in the form indicated above. In the event the Contractor shall have issued the Contractor's Notice of Readiness for Interim Inspection for Punchlist Completion prematurely, the Contractor shall be liable for the damages resulting therefrom, including but not limited to the salaries, professional fees, travel expenses, and living expenses of the persons or parties inconvenienced thereby.

6.3.6 Conducting the Interim Inspection for Punchlist Completion. The Design Professional will conduct the Inspection for Final Completion. The Design Professional will confirm the final punchlist has been completed including *all* Minor Items. Upon completion of the inspection, the Design Professional will issue a Report of Interim Inspection, noting any Permitted Incomplete Work that remains to be accomplished and the date by which it is to be completed. In the event *all* Permitted Incomplete Work has been completed at the time of this Interim Inspection, and the Design Professional so certifies, then this inspection shall be deemed an Inspection for Final Completion. In the event any Minor Item is determined to be incomplete, the Owner may give the fourteen-day notice of failure to complete the Work, as set forth in Article 6.2.3.

6.3.7 Conducting the Inspection for Final Completion. When all Permitted Incomplete Work has been completed or scheduled for completion, the Owner shall call for and the Design Professional shall schedule the Final Inspection with the Owner and Contractor. The Design Professional shall conduct the Inspection for Final Completion and shall confirm that all Permitted Incomplete Work has been completed. Then the Design Professional shall issue the Certificate of Final Completion and Final Payment and any remaining funds may, upon an Application for Payment, be paid to the Contractor. Any Final Documents not yet submitted must be submitted with the Application for Final Payment. In the event any item of Permitted Incomplete Work is determined to be incomplete and the date for its completion has passed, the Owner may give the fourteen-day notice of failure to complete the Work, as set forth in Article 6.2.3.

PART 4 – FINAL DOCUMENTS

6.4.1 Final Documents.

6.4.1.1 Final Documents Defined. Final Documents consist of all documents set forth in Division 1 of the specifications, as well as all warranties and guarantees required by the Contract Documents.

6.4.1.2 Minimum Specific Final Documents Required. Prior to submission of the Application for Payment for Material Completion, all Final Documents, including but not limited to the following, must be submitted to the Owner and Using Agency:

6.4.1.2.1 Affidavits.

(a) A Non-Influence Affidavit in the exact form as shown in Section 7, Forms.
(b) A Statutory Affidavit in the exact form as shown in Section 7, Forms. Any exceptions to the Statutory Affidavit are subject to the approval of the Owner.

6.4.1.2.2 Bonds.

(a) A Five-Year Bond for Roofs and Walls as shown in Section 7, Forms, written by a surety authorized to do business in the State of Georgia and in the penal sum of the actual cost of the exterior walls, wall cladding, wall components, wall insulation, roof insulation, roof deck and roof but not less than the amount shown as in the approved initial breakdown for these roof systems and wall systems.
(b) Any Bonds to Discharge Claim issued to Subcontractors and Suppliers as shown in Section 7, Forms.

6.4.1.2.3 Marked-up Construction Documents. The Contractor shall provide a complete set of Marked-up Contract Documents to the Design Professional, which set shall reflect all changes caused by RFIs, field changes, Change Orders, or observed changes by the Contractor or subcontractor(s) for the purpose of the Design Professional's issuance of Record Documents to the Owner.

6.4.1.2.4 Operation and Maintenance Data and Instructions and Training. The Contractor shall furnish proper written instructions to the Owner and Using Agency on operation and maintenance of all mechanical and electrical equipment. The Contractor shall provide training to the Using Agency in the operation and maintenance of all mechanical and electrical systems in the presence of the Design Professional and Owner and shall give notice in writing to the Design Professional, Owner and Using Agency at least fifteen days prior to the date it is proposes for the training. For all items of mechanical or electrical equipment or apparatus installed that require operation or maintenance after occupancy, the Contractor shall furnish and deliver to the Owner and Using Agency complete brochures and data as prepared and published by the manufacturers covering details of operation and maintenance.

6.4.1.2.5 Certificates of Manufacturers for Major Components. Certificates of Manufacturers shall be provided for elevators, moving walks, dumbwaiters, escalators, lifts, major components of HVAC and plumbing systems, e.g., cooling towers, compressors, condensers, absorption units, chiller units, fan coil units, air handling units, boilers, base mounted pumps, temperature controls, chemical feed systems; sewage pumps and water treatment systems, and incinerator systems; and major components of electrical systems. Start-up, testing, and placing into operation shall be performed by the field representative(s) of the manufacturer(s), and certificate(s) of the manufacturer(s) shall be filed with the Owner on the letterhead(s) of the manufacturer(s) in which the manufacturer(s) certifies or certify that "the equipment has been installed in strict compliance with the recommendations of the manufacturer(s) and is operating properly," in the format shown in Section 7, Forms. The manufacturer shall list in the certificate the item or items furnished to the job and the date, name, or other positive means of identifying any supplementary documents containing the recommendations of the manufacturer, with a copy of each of the supplementary documents attached to the certificate.

6.4.1.2.6 Final Certification of Costs. For proper capital asset reporting of the Project, the Contractor shall submit its Final Certification of Costs in the format set forth in Section 7, Forms.

6.4.1.2.7 Keys. Unless an alternative locking or keying system is specified, a minimum of two sets of keys, with tags indicating room number or room description or door each key is intended to fit attached

to each key, shall be delivered to the Owner and Using Agency. Contractor shall prepare and furnish with the keys an itemized key schedule listing the room number or room description or door, serial number of key, and number of keys being delivered for each door or lock.

6.4.2 Presentation of Final Documents. At the time of the Inspection for Material Completion, but in any event prior to the application for Final Payment, the Contractor will provide the Owner and Using Agency with a three ring binder containing all of the Final Documents, warranties, and guarantees required by the Contract Documents. Included in the binder shall be the documents indicating the brand names actually used in the installation of the work.

6.4.3 Keys. Keys with tags indicating number and/or description of door or room each key is intended to fit attached to each key shall be delivered to the Owner and Using Agency. The Contractor shall prepare and furnish with the keys an itemized key schedule in quintuplicate listing the door or room number and/or description, serial number of key, and number of keys being delivered for each door or lock.

PART 5 – PAYMENT FOR MATERIAL COMPLETION AND FINAL PAYMENT

6.5.1 Payment for Material Completion. Payment for Material Completion shall be due 10 days after receipt by the Owner of the application for payment upon achievement and certification of Material Completion, provided that Final Documents shall have been submitted. Payment shall be made by a check payable jointly to the Contractor and surety and shall be mailed to the surety.

6.5.2 Application for Payment for Material Completion.

6.5.2.1 Certification of Contractor. The Contractor shall certify, over his own signature, that the Work provided for by the Contract Documents has been completed under the terms and conditions thereof, and that the entire balance of the contract, including retainage, is due and payable, except for those amounts determined by the Design Professional to be withheld due to credits due to the Owner and Minor Items or Permitted Incomplete Work pursuant to Article 6.6.3 below.

6.5.2.2 Supporting Documentation.

6.5.2.2.1 Financial Data. The Contractor shall submit evidence satisfactory to the Design Professional that all payrolls, material bills, and other indebtedness connected with the work have been paid.

6.5.2.2.2 Affidavits and Bonds. The Contractor shall attach copies of the affidavits and bonds set forth in subparagraphs 6.4.2.2.1 and 2 above, execute the payment certification and forward it directly to the Design Professional.

6.5.3 Release of Contractor's Retainage.

6.5.3.1 Establishment of List. At the completion of the Inspection for Material Completion, the Design Professional and Contractor, with the consent of the Owner, shall develop the Final Punchlist. The Design Professional will assign a value for each the Minor Items and Permitted Incomplete Work.

6.5.3.2 Establishment of Amount of to be Withheld for Punchlist Items. In general, the amount to be withheld from the Payment for Material Completion and to be paid upon Final Completion shall be equal to 200% of the Design Professional's value of completing the Work for each Minor Item or Permitted Incomplete Work. The following additional amounts to be withheld shall be applied where applicable.

6.5.3.2.1 Mechanical and HVAC Systems. Until such time as the Design Professional shall have certified that the heating system has been balanced under seasonable weather conditions, the amount withheld shall in no event be less than $1,000.00.

6.5.3.2.2 Certificates. For each certificate required for major components a sum of $500.00 shall be withheld until such certificate shall have been filed with the Owner and Institution.

6.5.4 Effect of Payment for Material Completion and Release of Claims. Owner shall process the Payment for Material Completion as expeditiously as possible in accordance with the certification of the Design Professional, but interest shall not accrue until thirty (30) days have elapsed from receipt, unless error is found in the application or supporting documents. Acceptance of Payment for Material Completion by the Contractor shall operate as settlement, waiver, release, discharge and payment in full of all claims against Owner of any nature arising out of the Project except for the work associated with the Minor Items and the Permitted Incomplete Work.

6.5.5 Final Payment. Final Payment shall be due 10 days after receipt by the Owner of the application for payment upon achievement and certification of Final Completion, provided that Final Documents shall have been submitted. Payment shall be made by a check payable jointly to the Contractor and surety and shall be mailed to the surety. Owner shall process the Final Payment expeditiously as possible in accordance with the certification of the Design Professional, but interest shall not accrue until thirty (30) days have elapsed from receipt, unless error is found in the application or supporting documents.

6.5.5.1 Certification of Contractor. The Contractor shall certify, over his own signature, that the Work provided for by the Contract Documents has been completed under the terms and conditions thereof, and that the entire balance of the contract is due and payable.

6.5.5.2 Supporting Documentation.

6.5.5.2.1 Financial Data. The Contractor shall submit evidence satisfactory to the Design Professional that all payrolls, material bills, and other indebtedness connected with the work have been paid.

6.5.5.2.2 Affidavits and Bonds. The Contractor shall attach copies of the affidavits and bonds set forth in subparagraphs 6.4.2.2.1 and 2 above, execute the payment certification, and forward it directly to the Design Professional.

6.5.6 Effect of Final Payment and Release of Claims. Acceptance of Final Payment for Material Completion by the Contractor shall operate as settlement, waiver, release, discharge and payment in full of all claims against Owner of any nature arising out of the Project.

PART 6 – CORRECTION OF WORK AFTER FINAL PAYMENT

6.6.1 Non-Compliant or Defective Work. Neither the Design Professional's Certificate of Final Completion, nor any decision of the Design Professional, nor payment, nor any provision in the Contract shall relieve the Contractor of responsibility for faulty materials, faulty workmanship, or omission of contract work, and it shall remedy any defects or supply any omissions resulting therefrom and pay for any damage to other work resulting therefrom.

6.6.1.2 Notice of Non-Compliant or Defective Work. The Owner shall give notice of observed defects or omissions with reasonable promptness. Attached to or included within the notice shall be a Notice of Non-Compliant Work.

6.6.1.3 Correction of the Work. Within the space of time designated in Notices of Non-Compliant Work and without expense to the Owner, the Contractor shall correct, remedy, replace, re-execute, supply omitted work, or remove from the premises all work designated as non-compliant by the Design Professional. The Contractor shall give prompt notice in writing to the Design Professional, with copy to the Owner, upon completion of the supplying of any omitted work or the correction of any work designated as non-compliant by the Design Professional. In the absence of said notice, it shall be and is presumed under this Contract that there has been no correction of the non-compliant work or supplying of omitted work. If the Contractor does not remove, make good the deficiency, correct, or remedy faulty work, or supply any omitted work within the space of time designated in Notices of Non-Compliant Work, then the Owner, after ten days' notice in writing to the Contractor, may remove the work, correct the work, remedy the work or supply omitted work at the expense of the Contractor. In case of emergency involving health, safety of property, or safety of life the Owner may proceed at once with correction of the Work without waiving any rights of the Owner. Correction of defective work executed under the plans and specifications or supplying of omitted work whether or not covered by warranty of a subcontractor or supplier, remains the primary, direct responsibility of the Contractor. The foregoing obligation of the Contractor shall remain in effect until the expiration of the statute of limitations covering the Work.

6.6.2 Warranty and Guaranty. The Contractor warrants and guarantees that all work executed under the Contract Documents shall be free from defects of materials or workmanship for a period of one year from the date of Material Completion. Whenever a manufacturer's warranty or the Contract Documents call for written guaranties or warranties in excess of one year, the Contractor shall furnish them in such form as to permit direct enforcement by the Owner against any Subcontractor, Supplier, or manufacturer whose guaranty or warranty is called for. The Contractor further agrees to all of the following:

6.6.2.1 Jointly and Severally Liable. The Contractor is jointly and severally liable with such Subcontractors, Trade Contractors, Suppliers, or manufacturers;

6.6.2.2 Ratification of Warranties by the Contractor. The warranties and guaranties of the Subcontractors, Trade Contractors, Suppliers, and manufacturers are provided by the Contractor for purposes of performance under this article, and the Contractor, ratifies them by its warranty and guaranty;

6.6.2.3 Service of notice. Service of notice on the Contractor that there has been breach of any warranty or guaranty will be sufficient to invoke the terms of this article;

6.6.2.4 Bind Subcontractors, etc. The Contractor shall bind its Subcontractors, Trade Contractors, Suppliers, and manufacturers to the terms of this article; and

6.6.2.5 Warranties no Limitation. The calling for or the furnishing of written warranties shall in no way limit the contractual obligation of the Contractor to correct the work as set forth in this Part. The remedies stated in this article are in addition to the remedies otherwise available to the Owner, do not exclude such other remedies, and are without prejudice to any other remedies.

6.6.3 Warranty Complaint Item Procedure.

6.6.3.1 Notice of Warranty/Guaranty Complaint Items. The Owner and Using Agency may provide notice of warranty work by a warranty complaint letter, sent by statutory mail or facsimile to the Contractor. The letter should outline the complaint item in non-technical language. In emergency situations, the initial notification may be oral to a person or office designated by the Contractor. The Contractor shall respond promptly to all such notices.

6.6.3.2 Duty to Correct. During the one year period of the warranty and guaranty, any defects of material or workmanship that become apparent shall be the responsibility of the Contractor until and unless the Contractor can show abuse or design defect. The Contractor shall immediately correct all defects that become known during the one year period at no cost to the Owner unless notice is given to the Design Professional, Owner and Using Agency, prior to correcting the defect that the cause of the defect is the result of abuse or design deficiency.

6.6.3.2.1 Initial Response. When the Using Agency, the Owner, or the Design Professional notifies the Contractor of a defect, the Contractor will visit the site to review the complaint within five days and shall promptly correct the Work. If the Contractor fails to respond within this time limit, the Owner may correct the defect or malfunction and charge the Contractor for the Work. The Contractor shall give notice in writing to the Owner when corrections have been completed.

6.6.3.2.2 Design Defect or User Abuse. If the Contractor believes that a design defect or user abuse has caused the malfunction or defect, he will notify the Design Professional and the Design Professional will issue a formal decision in his capacity as Design Professional and initial interpreter of the conditions of the contract. If the Contractor disagrees with the Design Professional's response, he shall protest to the Owner in accordance with Section Five Part two. If it is determined the complaint is not the responsibility of the Contractor, the Contractor shall be promptly paid for the cost of the corrective work.

6.6.3.2.3 Emergency Situations. If the condition is an emergency, this will be communicated to the Contractor with the request that corrections are to be accomplished immediately. The Contractor shall respond to the notice in emergency situations within twenty-four hours. If the Contractor fails to respond within this time limit, the Owner may correct the defect and charge the Contractor for the Work. If it is determined the complaint is not the responsibility of the Contractor, the Contractor shall be promptly paid for the cost of the corrective work. The Contractor shall give notice in writing to the Owner when corrections have been completed.

SECTION 7 – FORMS

FORMS INDEX:

Performance Bond
Payment Bond
Contractor Affidavit and Certificate of Compliance
Subcontractor Affidavit and Certificate of Compliance
Non-Influence Affidavit
Statutory Affidavit
Specimen Certificate of Manufacturer
Certificate of Insurance
Bond to Discharge Claim
Change Order Forms
Application for Payment Form
Subcontractor Retainage Release Certificate
Final Certification of Costs

PERFORMANCE BOND

Bond No. _____

Project No. _____

KNOW ALL MEN BY THESE PRESENTS:

That Insert LEGALName and Physical Address of the CONTRACTOR as principal (hereinafter referred to as ("CONTRACTOR"),and Insert LEGAL Title and Physical Address of the Surety as surety (hereinafter referred to as "Surety"), are held and firmly bound unto the BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA BY AND ON BEHALF OF GEORGIA STATE UNIVERSITY as Obligee (hereinafter referred to as "Owner"), in the amount of Insert Construction Cost DOLLARS ($_____), to which payment CONTRACTOR and Surety bind Themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above bounden Principal has entered into a contract with the Owner bearing date of Insert Effective Date as Listed on page Contract-1 for: Insert Project Number and Description as listed on page Contract - 1 in accordance with drawings and specifications prepared by: Insert LEGAL Name and Physical Address of the Design Professional, which said contract is incorporated herein by reference and made a part hereof, and is hereinafter referred to as he Contract.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the CONTRACTOR shall promptly and faithfully perform and comply with the terms and conditions of said contract; and shall indemnify and save harmless the Owner against and from all cost, expenses, damages, injury or loss to which said Owner may be subjected by reason of any wrongdoing, including patent infringement, misconduct, want of care or skill, default or failure of performance on the part of said Principal, his agents, subcontractors or employees, in the execution or performance of said contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

(1) The said Surety to this bond, for value received, hereby stipulates and agrees that no change or changes, extension of time or extensions of time, alteration or alterations or addition or additions to the terms of the contract or to the work to be performed thereunder, or the specifications or drawings accompanying same, or the exercise of the Owner's right to do work pursuant to Articles 1.3.7 or 3.4.2 or Paragraphs 3.6.2.4 or 3.6.2.6, shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change or changes, extension of time or extensions of time, alteration or alterations or addition or additions to the terms of the contract or to the Work or to the specifications or drawings. In addition, the Surety to this bond, for value received, hereby agrees to the provisions of Article 1.5.1, including Paragraph 1.5.1.3 for increases in the penal amount of this bond, and waives notice from the Owner of any such changes.

(2) If pursuant to the Contract Documents the CONTRACTOR shall be declared in default by the Owner under the aforesaid Contract and the Owner has terminated the CONTRACTOR's right to complete the Contract, the Surety shall promptly perform this bond agreement in accordance with its terms and conditions. If Surety chooses to investigate, Owner shall cooperate with the Surety in its investigation and shall make all public project records available for inspection by Surety at no cost to Owner. It shall be the duty of the Surety to give an unequivocal notice in writing to the Owner, within twenty-five (25) days after receipt of such a declaration of default, of the Surety's election to either remedy the default or defaults promptly or to perform the Contract promptly, time being of the essence. In said notice of election, the Surety shall indicate the date on which the remedy or performance will commence, and it shall then be the duty of the Surety to give prompt notice in writing to the Owner immediately upon completion of (a) the remedy and/or correction of each default, (b) the remedy and/or correction or each item of condemned work, (c) the furnishing of each omitted item of work, and (d) the performance of the contract. The Surety shall not assert its Principal as justification for its failure to give notice of election or for its failure to promptly remedy the default or defaults or perform the Contract.

(3) It is expressly agreed by the Principal and the Surety that the Owner, if he desires to do so, is at liberty to make inquiries at any time of subcontractors, laborers, materialmen, or other parties concerning the status of payments for labor, materials, or services furnished in the prosecution of the work.

(4) No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the legal successors of the Owner.

(5) For the purposes of this bond, the name and address of the **responsible official of the Surety's claims department**, to whom correspondence and telecommunications may be addressed and/or with whom business concerning this bond may be conducted will be as follows:

NAME _____

TITLE _____

ADDRESS _____

CITY_____ STATE _____ ZIP CODE _____

TELEPHONE _____

EMAIL _____

(6) Further, this bond shall be the Performance Bond furnished under O.C.G.A. §§ 13-10-2, 13-10-20 and shall be subject to increase in the penal amount of the bond pursuant to such statutes and Article 1.5.1 of the Contract.

(7) No action can be instituted on this bond after one year from the date of Final Completion as determined pursuant to Article 6.2.2.

SIGNED AND SEALED THIS _____ DAY OF _____, 20_____.

ATTEST:

_____
Secretary(*)

Insert LEGAL Firm Name

By_____
President

_____
(Print Name)

_____
(SURETY) (*)(*)

_____
(NAME/TITLE)

(*) Please apply seal of Corporation over Secretary's Signature.
(*)(*) Please apply seal of Surety and arrange for countersignature by a "Georgia Licensed Agent" of Surety pursuant to O.C.G.A. §33-23-5. Kindly show title of the aforesaid agent as "Georgia Licensed Agent."

(*) Attach Power of Attorney

PAYMENT BOND

Bond No. _____

Project No. _____

KNOW ALL MEN BY THESE PRESENTS:

That Insert LEGALName and Physical Address of the CONTRACTOR as Principal (hereinafter referred to as the "Principal") and Insert LEGAL Title and Physical Address of the Surety as Surety (hereinafter referred to as "Surety", are held and firmly bound unto the BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA BY AND ON BEHALF OF GEORGIA STATE UNIVERSITY as Obligee (hereinafter referred to as "Owner") for the use and benefit of claimants defined, hereinafter in the amount of:
Insert Construction Cost DOLLARS ($_____),
to which payment Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above bounden Principal has entered into a contract with Owner dated Insert Effective Date as Listed on page Contract-1 for:Insert Project Number and Description as listed on page Contract - 1 in accordance with drawings and specifications prepared by: Insert LEGAL Name and Physical Address of the Design Professional, which contract is incorporated herein by reference and made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and materials supplied in the prosecution of the work provided for in said Contract, then this obligation shall be void, otherwise it shall remain in full force and effect subject, however, to the following conditions:

(1) The said Surety to this bond, for value received, hereby stipulates and agrees that no change or changes, extension of time or extensions of time, alteration or alterations or addition or additions to the terms of the contract or to the work to be performed thereunder, or the specifications or drawings accompanying same, or the exercise of the Owner's right to do work pursuant to Articles 1.3.7,1.7.8 or 5.3.5 or Paragraphs 3.4.1.4 or 5.3.2.3, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change or changes, extension of time or extensions of time, alteration or alterations or addition or additions to the terms of the contract or to the Work or to the specifications or drawings. In addition, the Surety to this bond, for value received, hereby agrees to the provisions of Article 1.5.1, including Paragraph 1.5.1.3, for increases in the penal amount of this bond and waives notice from the Owner of any such changes.

(2) A claimant is defined as any subcontractor and any person supplying labor, materials, machinery, or equipment in the prosecution of the work provided for in said contract.

(3) Every person entitled to the protection hereunder and who has not been paid in full for labor or materials furnished in the prosecution of the work referred to in said bond before the expiration of a period of ninety (90) days after the day on which the last of the labor was done or performed by him, or materials or equipment or machinery was furnished or supplied by him for which claim is made, shall have the right to sue on such payment bond for the amount, or the balance thereof, unpaid at the time of the commencement of such action and to prosecute such action to final execution and judgment for the sum or sums due him, provided, however, that any person having direct contractual relationship with a subcontractor, but no contractual relationship express or implied with the Contractor furnishing said payment bond shall have (a) given written notice to said Contractor within ninety (90) days from the day on which such person did or performed the last of the labor, or furnished the last of the materials or machinery or equipment for which such claim is made stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished or supplied or for whom the labor was performed or done; and (b) if the Contractor has filed a Notice of Commencement in accordance with the requirements of O.C.G.A. §13-10-62 and Articles 4.3.2 of the contract, given to said contractor a written Notice to Contractor within 30 days from the filing of the Notice of Commencement or 30 days following the first delivery of labor, materials, machinery or equipment, whichever is later, setting forth:

A) The name, address, and telephone number of the person providing labor, material, machinery, or equipment;

B) The name and address of each person at whose instance the labor, material, machinery or equipment is being furnished;

C) The name and the location of the public work; and

D) A description of the labor, material, machinery, or equipment being provided and, if known, the contract price or anticipated value of the labor, material, machinery, or equipment to be provided or the amount claimed to be due, if any.

It is provided further that nothing contained herein shall limit the right of action to said 90-day period. Notice may be served by the depositing of a notice, certified mail, postage paid, duly addressed to the Contractor at any place he maintains an office or conducts his business, or his residence, in any post office or branch post office or any letter box under the control of the Post Office Department or notice may be served by statutory mail pursuant to O.C.G.A. §9-10-12 or in any manner in which the sheriffs of Georgia are authorized by law to serve summons or process. Every suit instituted under this section shall be brought in the name of the claimant without Owner being made a party thereof. The official who has custody of said

bond is authorized and directed to furnish, to any person making application thereof who submits an affidavit that he has supplied labor or materials for such work and payment therefore has not been made, or that he is being sued on any such bond, a copy of such bond and the contract for which it was given, certified, by the official who has custody of said bond and contract shall be admitted in evidence without further proof. Applicants shall pay for such certified statements and such fees as the official fixes to cover the cost of preparation thereof, but in no case shall the fixed fee exceed the fees that the clerks of the superior courts are permitted to charge for similar copies.

(4) It is expressly agreed by the Principal and the Surety that the Owner, if he desires to do so, is at liberty to make inquiries at any time of subcontractors, laborers, materialmen, or other parties concerning the status of payments for labor, materials, or services furnished in the prosecution of the work.

(5) For the purposes of this bond, the name and address of **the responsible official of the Surety's claims department**, to whom correspondence and telecommunications may be addressed and/or with whom business concerning this bond may be conducted will be as follows:

NAME _____

TITLE _____

ADDRESS _____

CITY_____ STATE _____ ZIP CODE _____

TELEPHONE _____

EMAIL _____

(6) Further, this bond shall be the Payment Bond furnished under O.C.G.A. §§ 13-10-1, 13-10-60 *et seq.* and shall be subject to increase in the penal amount of the bond pursuant to such statutes and Article 1.5.1 of the Contract.

(7) No action can be instituted on this bond after one year from the date of Final Completion as determined pursuant to Article 6.2.2.

SIGNED AND SEALED THIS _____ DAY OF _____, 20_____.

ATTEST:

_____
Secretary(*)

Insert LEGAL Firm Name

By_____
President

_____
(Print Name)

_____
(SURETY) (*)(*)

_____
(NAME/TITLE)

(*) Please apply seal of Corporation over Secretary's Signature.
(*)(*) Please apply seal of Surety and arrange for countersignature by a "Georgia Licensed Agent" of Surety pursuant to O.C.G.A. §33-23-5. Kindly show title of the aforesaid agent as "Georgia Licensed Agent."

(*) Attach Power of Attorney

Contractor Affidavit under O.C.G.A. § 13-10-91(b)(1)

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services on behalf of Board of Regents of the University System of Georgia by and on behalf of **Georgia State University** (public employer) has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program, in accordance with the applicable provisions and deadlines established in O.C.G.A. § 13-10-91. Furthermore, the undersigned contractor will continue to use the federal work authorization program throughout the contract period and the undersigned contractor will contract for the physical performance of services in satisfaction of such contract only with subcontractors who present an affidavit to the contractor with the information required by O.C.G.A. § 13-10-91(b). Contractor hereby attests that its federal work authorization user identification number and date of authorization are as follows:

_____ (This is a 6 digit number – no letters*)
Federal Work Authorization User Identification Number

_____
Date of Authorization

_____
Name of Contractor

_____
Project Number & Name as listed on page Contract-1

Board of Regents of the University System of Georgia
By and on behalf of Georgia State University

I hereby declare under penalty of perjury that the foregoing is true and correct.

Executed on _____, ___, 20__ in _____(city), _____(state).

_____ Signature of Authorized Officer or Agent

_____
Printed Name and Title of Authorized Officer or Agent

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

_____
NOTARY PUBLIC
(affix seal)

My Commission Expires: _____

*Link to obtain or look up E-verify number: http://www.uscis.gov/node/44210

Sub-contractor Affidavit under O.C.G.A. § 13-10-91(b)(1)

By executing this affidavit, the undersigned Sub-contractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services on behalf of Board of Regents of the University System of Georgia by and on behalf of **Georgia State University** (public employer) has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program, in accordance with the applicable provisions and deadlines established in O.C.G.A. § 13-10-91. Furthermore, the undersigned Sub-contractor will continue to use the federal work authorization program throughout the contract period and the undersigned Sub-contractor will contract for the physical performance of services in satisfaction of such contract only with Sub-contractors who present an affidavit to the Sub-contractor with the information required by O.C.G.A. § 13-10-91(b). Sub-contractor hereby attests that its federal work authorization user identification number and date of authorization are as follows:

_____ (This is a 6 digit number – no letters*)
Federal Work Authorization User Identification Number

_____
Date of Authorization

_____
Name of Sub- Contractor

_____
Project Number & Name as listed on page Contract-1

Board of Regents of the University System of Georgia
By and on behalf of Georgia State University

I hereby declare under penalty of perjury that the foregoing is true and correct.

Executed on _____, ___, 20__ in _____(city), _____(state).

_____ Signature of Authorized Officer or Agent

_____
Printed Name and Title of Authorized Officer or Agent

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

_____
NOTARY PUBLIC
(affix seal)

My Commission Expires: _____

*Link to obtain or look up E-verify number: http://www.uscis.gov/node/44210

NON-INFLUENCE AFFIDAVIT

COUNTY OF _____

STATE OF _____

I do solemnly swear on my oath that as to the Contract dated_____, 20_____, between _____
(NAME OF CONTRACTOR)

and the Owner, I have no knowledge of the exertion of any influence or the attempted exertion of any influence on the firm on behalf of which this affidavit is made in any way, manner, or form in the purchase of materials, equipment, or other items involved in construction, manufacture, or employment of labor under the aforesaid Contract by any employee, officer, or agent of the Owner, or any person connected with the State Government of Georgia in any way whatsoever.

This _____ day of _____, 20_____.

_____(L.S.)
Signature

_____
Title

_____
Firm

COUNTY OF _____

STATE OF _____

Personally before me, the undersigned authority, appeared_____
(NAME OF PERSON SIGNING THE AFFIDAVIT)
who is known to me to be an official of the firm of _____,
(NAME OF CONTRACTOR)
and who, after being duly sworn, stated on his oath that he had read the above statement and that the same is true and correct.

_____
Notary Public

My Commission expires _____

This_____ day of _____, 20____.

STATUTORY AFFIDAVIT

COUNTY OF _____ STATE OF _____

FROM: _____
Contractor

TO: _____
Owner

Re: Contract entered into the _____ day of _____, 20____, between the above-mentioned parties for the construction

of Project No. _____ located at _____

KNOW ALL MEN BY THESE PRESENTS:

1. The undersigned hereby certifies that all work required under the above Contract has been performed in accordance with the terms thereof, that all Subcontractors, Suppliers, Trade Contractors, mechanics, and laborers have been paid and satisfied in full, or will be paid and satisfied in full out of the proceeds of this payment as set forth in O.C.G.A. §13-10-80, and that there are no outstanding claims of any character [including disputed claims or any claims to which the Contractor has or will assert any defense] arising out of the performance of the Contract which have not been paid and satisfied in full except as listed herein below:.....

Instructions to Contractor- ENTER THE WORD "NONE" OR LIST THE NAMES OF CLAIMANTS

2. The undersigned further certifies that to the best of his knowledge and belief there are no unsatisfied claims for damages resulting from injury or death to any employees, Subcontractors, or the public at large arising out of the performance of the contract, or any suits or claims for any other damage of any kind, nature, or description which might constitute a lien upon the property of the Owner.

3. The undersigned makes this affidavit for the purpose of receiving final payment in full settlement of all claims against the Owner arising under or by virtue of the contract, and acceptance of such payment is acknowledged as a release of the Owner from any and all claims arising under or by virtue of the contract.

This _____ day of _____, 20_____.

_____(L.S.)
Signature

_____
Title

_____
Firm

COUNTY OF _____ STATE OF _____

Personally before me, the undersigned authority, appeared_____
(NAME OF PERSON SIGNING THE AFFIDAVIT)

who is known to me to be an official of the firm of _____,
(NAME OF CONTRACTOR)

and who, after being duly sworn, stated on his oath that he had read the above statement and that the same is true and correct.

_____
Notary Public

My Commission expires _____

This_____ day of _____, 20____.

SPECIMEN CERTIFICATE OF MANUFACTURER

INSTRUCTIONS FOR PREPARATION OF CERTIFICATE: To be acceptable, the certificate must be prepared in the form indicated by this specimen on the official letterhead of the manufacturer. No portions of the certificate may be omitted. Attached is a copy of the Contract provision under which the certificate is required. The Authority needs only one copy of the certificate. If equipment of a manufacturer is not installed in strict compliance with the recommendations of the manufacturer or if in the design of the work the equipment is not applied in strict compliance with the recommendations of the manufacturer, a letter from the manufacturer should be forwarded to the Contractor [with copies to the Design Professional and the Owner] setting forth a list of the deviations from the recommendations of the manufacturer and stating what remains to be done in order to bring the work into strict compliance with the recommendations of the manufacturer. Prior to calling upon the representative of the manufacturer for performance of the services necessary to enable him to execute a certificate in accordance with this specimen, it is the obligation of the Contractor to have installed the work in strict compliance with the recommendations of the manufacturer [See Article 2.2.4 of the Contract], and it is likewise the obligation of the Contractor to have put the equipment in good operating condition in absolute and final readiness for the "start-up," "testing," and "placing into operation" as defined herein below by the representative of the manufacturer.

Date:_____

Insert name and address of Owner

Re: Certificate of [JOHN DOE CORPORATION] that equipment or components furnished by it has [or have, as the case may be] been installed in strict compliance with its recommendations and is [or are, as the case may be] operating properly at PROJECT NO._____

Gentlemen:

1. We certify through our duly authorized and acting agent that the following item [or items, as the case may be] furnished by us to the Project named in the caption was [or were, as the case may be] started up, tested, and placed in operation by our authorized field representative on [enter the date on which the field representative performed the start-up, test, and placing into operation] and is [or are, as the case may be] operating properly:

[List the item or items furnished to the job. Show catalogue number or numbers.]

2. We certify further that the aforesaid equipment was installed in strict compliance with our recommendations as published by us in the following document [or documents, as the case may be]:

[Insert the date, name, or other positive means of identifying the exact document or documents in which the recommendations for installation and use of the item or items are published.] (*)

3. A copy of the aforesaid document(s) is (are) attached hereto.

This _____ day of_____, 20____

JOHN DOE CORPORATION

By:_____
Authorized Representative

(*) The date must be shown
[See Article 6.4.1.2.5
DEFINITIONS:
1. "Start-up" is defined as putting the equipment into action.
2. "Testing" is defined as performing such testing as is stipulated in the Contract Documents to be performed.
3. "Placing into operation" is defined as operating the equipment for a sufficient period of time for the determination to be made that it is performing properly.

INSTRUCTIONS TO PRODUCING AGENT: COMPLETE THE SHADED PORTIONS OF THIS CERTIFICATE OR SIMILAR FORM AND RETURN TO THE INSURED, WITH ADDITIONAL INSURED ENDORSEMENTS ATTACHED. NO CONDITION, TERM, QUALIFICATION, LIMITATION, EXCEPTION, EXEMPTION, MODIFICATION, OR PROVISO SHALL APPEAR ON THE CERTIFICATE.

Certificate of Insurance

Name, Address and Telephone Number of Producing Agent	**PROJECT NO.**: Project Number Here
	PROJECT NAME: Project Description, Institution Here
Name and Address of Insured Contractor (Contractor)	**Certificate Holder(Owner)**: Board of Regents of the University System of Georgia 270 Washington Street, SW, 6th Floor Atlanta, Georgia 30334 ***Attn: Director of Contracts & Services, Office of Facilities***

Type of Insurance	Policy No.	Company Affording Coverage	Policy Expiration Date	Limits
Commercial General Liability(1993 ISO Occurrence Form or its equivalent); Includes XCU Coverage				Each Person $1,000,000.00 Each Occurrence $1,000,000.00 Products-Co./Op Agg $1,000,000.00 Personal & Adv injury $1,000,000.00 Contractual $1,000,000.00 General Aggregate $2,000,000.00
Commercial Business Automobile Liability				Bodily Injury $1,000,000.00 Property Damage $1,000,000.00 Combined Single Limit $1,000,000.00
Commercial Umbrella Liability				Each Occurrence $2,000.000.00 Aggregate $4,000,000.00
Workers Compensation				W C Statutory Limits
Employers' Liability				Each Accident $1,000,000.00 Disease Each Employee $1,000,000.00 BI - Disease-Aggregate $1,000,000.00
Builders Risk written on 1991 Cause of Loss-Special Form or its equivalent OR **Installation Floater** (for other than new construction)				Cost of Project

The insured contractor has provided the contract provisions concerning insurance to the Undersigned, and the Undersigned had reviewed the insurance coverages required for the project referenced above and makes the following certifications, which shall serve to bind the various insurance carriers as follows:

1. Such insurance as is herein certified (i) are written in accordance with the company's regular policies and endorsements, subject to the company's applicable manuals or rules and rates in effect, (ii) have been issued to the insured named above, and (iii) are in force at this time.
2. With the exception of the Workers Compensation policy, the Officers, Members, Agents, & Employees of the Owner and the State of Georgia are included as additional insureds as their interests may appear and a copy of the additional insured endorsement(s) is attached hereto. The undersigned certifies that he has so notified each Insurer that Georgia law requires that the Attorney General of Georgia shall represent and defend the state entities and Indemnities named herein remains in full force and effect and is not waived by issuance of any policy of insurance Disease Each Employee $1,000,000.00
BI - Disease-Aggregate $1,000,000.00.
3. Each policy either provides or has been endorsed to meet Georgia law that the policy shall not be canceled, changed, allowed to lapse, or allowed to expire for any reason until thirty (30) days (10 days for non-payment of premium) after the Certificate holder has received written notice thereof as evidenced by return receipt of certified or overnight letter.

Authorized Representative: _____ Date: _____

Typed Name: _____

THIS FORM IS FOR OPTIONAL USE TO RELEASE TO THE CONTRACTOR FUNDS WITHHELD FROM A PAY APPLICATION IN THE EVENT A SUBCONTRACTOR FILES A CLAIM AGAINST THE CONTRACT BALANCE HELD BY THE OWNER THAT REMAINS UNRESOLVED. THIS IS A SUBORDINATE DOCUMENT TO THE PAYMENT BOND FOR THE PROJECT, AND IS CALCULATED AGAINST THE PENAL AMOUNT OF THAT PAYMENT BOND. THERE ARE OTHER METHODS THAT MAY BE USED TO REMEDY SUCH SITUATIONS, HOWEVER, THIS FORM IS EFFECTIVE WHEN NONE OF THE PARTIES ARE ABLE TO REACH AGREEMENT UPON THE CLAIM.

BOND TO DISCHARGE CLAIM

WHEREAS, _____ (hereinafter referred to as "Claimant" has filed a claim against _____ (the "Contractor", hereinafter referred to as "Principal") on the following contract:

WHEREAS, the undersigned Principal and Surety have issued Payment Bond No. _____ (the "Primary Bond") to the Owner, as Obligee, on the Contract dated _____ for Project _____ _____ ;

WHEREAS, the undersigned Principal and Surety dispute the Claimant's entitlement to all or part of the claim and expressly reserve all rights and defenses available at law in connection therewith;

WHEREAS, _____ as Principal and _____ as Surety, desire to continue to receiving payments from the Owner for work done on the above referenced project,

NOW THEREFORE, in consideration of these premises, the undersigned Principal and Surety do hold themselves firmly bond unto _____ as Claimant, in the total amount of _____ dollars ($_____), representing double the amount of the claim.

The condition of this Bond to Discharge Claim is such that should the undersigned Principal or Surety pay to the Claimant the sum that may be found to be due to the Claimant upon the trial of any action that may be filed by said Claimant, or if Principal or Surety pay to the Claimant a sum agreeable to Claimant and Claimant accepts such payment, then this Bond shall be void; otherwise to remain in full force and effect.

The penal amount of the Primary Bond is conditionally reduced by the amount of this Bond to Discharge Claim, and upon payment of any sums to the Obligee under this Bond to Discharge Claim, the penal amount of the Primary Bond is reduced *instanter* by the amount of such payment.

No action can be instituted on this bond after one year from the date of Final Completion as determined pursuant to Article 6.2.2 of the Contract.

IN WITNESS WHEREOF, the said Principal and Surety have set their hands and seals this _____ day of _____, 20___.

_____
Principal

by:_____

_____
Surety

by:_____
Attorney-in-Fact

_____
Type Name Above

CHANGE ORDER
DESIGN-BID-BUILD CONSTRUCTION CONTRACT
Contract ID No. _____

NOTE TO DESIGN PROFESSIONAL:

Please prepare each Change Order in the form and wording given below, deleting inapplicable wording and adding such explanations as may be necessary. The wording in Paragraph 11 may not be changed or altered in any way by either the Design Professional or the Contractor. Send four copies, signed by you and the Contractor, to the Owner. *Do not forward a Change Order unless it is accompanied by a breakdown which has been certified by the Contract Compliance Specialist and Program Manager (if applicable)*.

CHANGE ORDER No. _____

Project No. _____

Project Name: _____

BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA by and on Behalf of **GEORGIA STATE UNIVERSITY**, Owner

Note to Design Professional:: *No Change Order should be forwarded unless you have been furnished with a letter from the Owner authorizing same.*

The date of this Change Order No. ____ is _____.

1. Submission of this Change Order for consideration was authorized by letter from the Owner, dated ____, 20__,

2. The changes hereinafter described are applicable to the Contract for the construction of the above-referenced Project and amend the Contract Documents.

3. Description of Change:

Note to Design Professional: *Be sure to give a complete statement describing the changes in the work, including the specifications. If drawings are necessary, refer to them by date, etc., and state they are made a part of the Change Order. Copy of drawings should be attached to the Change Order.*

4. This Change Order is deemed necessary and originated with the (Design Professional) (Owner) (Contractor). *(Indicate applicable entity.)*

5. This Change Order is necessary to:

Note to Design Professional: *Give a complete description of conditions which necessitate the change.*

6. The amount of the Change Order was determined by:

Choose one:
a. Estimate and acceptance in lump sum.
b. Unit prices stated in contract or subsequently agreed upon.
c. Cost and percentage as described in general conditions.

7. A memorandum is attached showing cost breakdown of labor and materials by unit and quantities as prepared by the Contractor and checked by the Contract Compliance Specialist and Program Manager (if any).

8. We have verified the quantity and quality of all materials shown on the memorandum. We have verified that all prices are reasonable and do not exceed current costs for like services or materials, and we have verified that the quality of the materials meets the requirements of the Contract Documents.

Note to Design Professional: *Please observe that verification of quantities and prices means the Design Professional who signs the Change Order has personal knowledge that the quantities shown in the memorandum referred to under paragraph 7 above are correct, that he has personally satisfied himself that full credit has been extended for any work or materials deleted or omitted, and that he has conclusively established by such checking or inquire as may be necessary that the prices and allowances shown in the memorandum comparable with current costs for like services and materials.*

9. The contractor shall be allowed _____ additional calendar days for completion. The Material Completion and Occupancy Date is: _____.

9. a. The contract end date shall be _____.

Note to Design Professional: *Please insert the number of additional Days allowed and the new Material Completion and Occupancy Date, or, if no additional time is allowed, insert "0" for the Days and "No Change" for the date.*

10. The Contract Sum shall be *(increased) (decreased)* by $ _____ on account of this change.

Original Contract Amount	
Sum of Previous Changes	
Current Contract Amt	
Amount of this Change	
New Contract Amount	

Note to Design Professional: *Please delete inapplicable language in parentheses and enter the dollar amount for this change. Insure that cost of the Work, percentage markup for profit, and the daily rate of general conditions costs is accurate and included in the amount of an additive change. If a deductive change, the amount is generally cost of the work only; however, consult with the owner in significant deductive Change Orders to determine if time or profit should be included in the deducted amount.*

11. The payment and extension of time, if any, provided by this Change Order constitutes compensation in full to the Contractor and its Subcontractors, Suppliers, and Trade Contractors for all costs and markups, directly and indirectly attributable to the changes ordered herein, and for all delays or time related costs thereto and for any acceleration costs for performance of changes within the time stated and to be completed by the Material Completion and Occupancy Date and for any claims related thereto against the Owner and the Design Professional, and design consultants.

APPROVED AND AGREED BY CONTRACTOR:
INSERT CONTRACTOR'S NAME HERE

By: _____
Signature
Printed Name: _____

Date approved by Contractor: _____

RECOMMENDED FOR OWNER'S ACCEPTANCE:
DESIGN PROFESSIONAL: (INSERT DP FIRM NAME HERE)

By: _____
Signature
Printed Name: _____

Date approved by DP: _____

APPROVED AND AGREED BY OWNER 'S REPRESENTATIVE/PROJECT MANAGER:

By: _____
Signature
Printed Name: _____

Date approved: _____

APPROVED AND AGREED BY OWNER

BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA BY AND ON BEHALF **GEORGIA STATE UNIVERSITY**

By: _____
Signature
Printed Name: _____

Date approved: _____

CHANGE ORDER FORMAT
(Force Account or Indeterminate Units)

NOTE TO DESIGN PROFESSIONAL:
Please prepare each Change Order in the form and wording given below, deleting inapplicable wording and adding such explanations as may be necessary. The wording in Paragraph 8 may not be changed or altered in any way by either the Design Professional or the Contractor. The wording in Paragraph 5 of the Final Cost Amendment may not be changed or altered in any way by either the Design Professional or the Contractor. Send four copies, signed by you and the Contractor, to the Owner. *Do not forward a Change Order unless it is accompanied by a breakdown which has been checked by the Contract Compliance Specialist and Program Manager (if applicable)*.

CHANGE ORDER No. _____

Note to Design Professional: *Please leave the Change Order number blank. The Owner will assign a number.*

Project Name: _____
Project Number: _____

Owner

Note to Design Professional:: *No Change Order should be forwarded unless you have been furnished with a letter from the Owner authorizing same.*

1. Submission of this Change Order for consideration was authorized by letter from the Owner, dated ____, 200__, Incumbrance Record No. _____.

2. The changes hereinafter described are applicable to the Contract for the construction of the above-referenced Project and amend the Contract Documents..

3. Description of Change:

Note to Design Professional: *Be sure to give a complete statement describing the changes in the work, including the specifications. If drawings are necessary, refer to them by date, etc., and state they are made a part of the Change Order. Copy of drawings should be attached to the Change Order.*

4. This Change Order is deemed necessary and originated with the (Design Professional) (Owner) (Contractor) (Using Agency). *(Indicate applicable entity.*)

5. This Change Order is necessary to:

Note to Design Professional: *Give a complete description of conditions which necessitate the change.*

6. The Maximum Allowable Cost of the Change Order was estimated by:

Choose one:
a. Estimate in lump sum.
b. Unit prices stated in contract or subsequently agreed upon, and an estimated number of units.
c. Cost and percentage as described in general conditions.

7. A memorandum is attached showing the estimated cost breakdown of labor and materials by unit and quantities as prepared by the Contractor and checked by the Contract Compliance Specialist and Program Manager (if any).

8. The Maximum Allowed Cost for this Change Order is $ _____, and is established as Incumbrance Record No. _____ . This Maximum Allowed Cost may be amended by the Owner in the event the actual costs are expected to exceed the Maximum Allowed Cost, provided that Contractor shall give written notice of such fact prior to incurring actual costs in excess of ninety percent of the Maximum Allowable Cost. In no event shall actual costs be incurred in excess of the Maximum Allowed Cost, as it may be amended.

RECOMMENDED FOR OWNER'S ACCEPTANCE:

(DESIGN PROFESSIONAL)

By: _____

Date approved by Design Professional: _____

APPROVED AND AGREED BY OWNER:

BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA

By: _____

Date approved by Owner: _____

APPROVED AND AGREED BY CONTRACTOR:

By: _____

Date approved by Contractor: _____

APPROVED AND AGREED BY USING AGENCY

By: _____

Date approved by Using Agency: _____

FINAL COST AMENDMENT
TO
CHANGE ORDER NO. _____

1. A memorandum is attached showing cost breakdown of labor and materials by unit and quantities as prepared by the Contractor and checked by the Contract Compliance Specialist and Program Manager (if any).

2. We have verified the quantity and quality of all materials shown on the memorandum. We have verified that all prices are reasonable and do not exceed current costs for like services or materials, and we have verified that the quality of the materials meets the requirements of the Contract Documents.

> Note to Design Professional: *Please observe the fact that verification of quantities and prices means the Design Professional who signs the Change Order has personal knowledge that the quantities shown in the memorandum referred to under paragraph 7 above are correct, that he has personally satisfied himself that full credit has been extended for any work or materials deleted or omitted, and that he has conclusively established by such checking or inquire as may be necessary that the prices and allowances shown in the memorandum comparable with current costs for like services and materials.*

3. The contractor shall be allowed _____ additional calendar days for completion. The Material Completion and Occupancy date is: _____ .

> Note to Design Professional: *Please insert the number of additional Days allowed and the new Material Completion and Occupancy Date, or, if no additional time is allowed, insert "0" for Days and "No Change" for the date.*

4. The Contract Sum shall be *(increased) (decreased)* by $ _____ on account of this change.

> Note to Design Professional: *Please delete inapplicable language in parentheses and enter the dollar amount for this change. Insure that cost of the Work, percentage markup for profit, and the daily rate of general conditions costs is accurate and included in the amount of an additive change. If a deductive change, the amount is generally cost of the work only; however, consult with the owner in significant deductive Change Orders to determine if time or profit should be included in the deducted amount.*

5. The payment and extension of time, if any, provided by this Change Order constitutes compensation in full to the Contractor and its Subcontractors, Suppliers, and Trade Contractors for all costs and markups, directly and indirectly attributable to the changes ordered herein, and for all delays or time related costs thereto and for any acceleration costs for performance of changes within the time stated and to be completed by the Material Completion and Occupancy Date and for any Claims related thereto against the Owner and the Design Professional, and design consultants.

RECOMMENDED FOR OWNER'S ACCEPTANCE:	APPROVED AND AGREED BY OWNER:
(DESIGN PROFESSIONAL)	BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA
By: _____	By: _____
Date approved by Design Professional: _____	Date approved by Owner: _____
APPROVED AND AGREED BY CONTRACTOR:	APPROVED AND AGREED BY USING AGENCY
By: _____	By: _____
Date approved by Contractor: _____	Date approved by Using Agency: _____

EXHIBIT K
APPLICATION FOR PAYMENT
CERTIFICATE OF THE CONTRACTOR OR HIS DULY AUTHORIZED REPRESENTATIVE

PROJECT NO. _____ PROJECT NAME: _____

APPLICATION FOR PAYMENT NO. ____ PERIOD TO: _____

CERTIFICATE OF CONTRACTOR OR HIS DULY AUTHORIZED REPRESENTATIVE

To the best of my knowledge and belief, I certify that all items, units, quantities and prices of work and material shown on this **Application for Payment No.** _____are correct; that all work has been performed and materials supplied in full accordance with the terms and conditions of the Contract Documents between Board of Regents of the University System of Ga. by and on Behalf of Georgia State University, Owner, and _____, **Contractor** dated _____, and all authorized changes thereto; and that the following is a true and correct statement of the contract account up to and including the last day of the period covered by this Application and that no part of the "amount due this Application" has been received.

(a)	**Original Contract Sum**	**$0.00**
(b)	**Net Change by Change Orders**	**$0.00**
(c)	**Contract Sum to Date**	**$0.00**
(d)	Total earned for work in place - Original Contract	$0.00
(e)	Total earned for work in place - Change Orders	$0.00
(f)	Value of materials stored	$0.00
(g)	Total earned and stored to date: (d)+(e)+(f)	$0.00
(h)	Amount retained (10%)	$0.00
(i)	Total earned less retainage: (g) minus (h)	$0.00
(j)	Total amount previously approved	$0.00
(k)	**Amount due THIS APPLICATION : (i) minus (j)**	**$0.00**
(L)	Balance to finish including retainage: (c) minus (i)	$0.00

I further certify that all claims outstanding against the undersigned Contractor for all labor, materials, and expendable equipment employed in the performance of said contract have been paid in full in accordance with the requirements of said contract, except such outstanding claims as are listed below or on the attached sheet, which statement contains all claims against the Contractor which are not yet paid, including all disputed claims and any claims to which the Contractor has or will assert any defense. I further certify that all of the materials indicated on this Application for Payment as being stored on the Site, but not yet incorporated into the building, have been purchased, delivered, and are now stored on the Site for future incorporation into the building and until so incorporated the title to same is, upon payment of this statement, vested in the Owner. Furthermore, the undersigned Contractor assumes full responsibility for the existence, protection, and, if necessary, replacement of the above mentioned materials until the

Contractor: _____ **Date:** _____

By: _____ **Title:** _____

CERTIFICATE OF THE DESIGN PROFESSIONAL

I certify that I have verified this Application for Payment and, to the best of my knowledge and belief, it is a true and correct statement of work performed and statement of materials stored on site by the Contractor and that the Contractor's certified statement of his account and the amount due him is correct and just. I further certify that all work has been performed and materials have been supplied in full accordance with the terms and conditions of the Contract Documents and authorized changes thereto.

Design Professional _____**, Signature** _____ **Date:** _____

STATEMENT OF GSU PROJECT MANAGER

I have checked this Application for Payment and, to the best of my knowledge and belief, the statement of work performed and statement of materials stored on site by the Contractor are supported by my observations.

Signature _____**, Project Manager Date:** _____

SCHEDULE OF CHANGE ORDERS

In support of Application for Payment No.

Project No._____ Period Ending:

Contractor:

CHANGE ORDERS		ADDITIONS			DEDUCTIONS
Number (1)	Date (2)	Authorized Amount (3)	Amount this Period (4)	Completed Previous Periods (5)	Authorized Deductions (6)

WORK PERFORMED TO DATE

In support of Application for Payment No.

For the period from _____, through _____ inclusive.

Project No.

Name and location of Project

Contractor's Name and Address

WORK INCLUDED IN ORIGINAL CONTRACT

DETAILED ESTIMATE				WORK PERFORMED TO DATE			
CSI Category and Description Item No. and Designation (1)	Number & Kind of Units (2)	Unit Price (3)	Estimated Cost (4)	No. of Units (5)	Amount Earned to Date (6)	Value of Incomplete Work (7)	Percent Complete (8)
A. Contracting Requirements: *							
a.							
b.							
c,							
1. Division 1 – General Requirements: *							
a.							
b.							
c.							
2. Division 2 – Site Construction: **							
(i) Building							
a.							
b.							
c.							
(ii) Infrastructure							
a.							
b.							
c.							
3. Division 3 – Concrete: *							
a.							
b.							
c.							
4. Division 4 – Masonry: **							
(i) Building							
a.							
b.							
c.							
(ii) Infrastructure							
a.							
b.							
c.							
5. Division 5 – Metals: *							
a.							
b.							
c.							

6. Division 6 – Wood and Plastics: *							
a.							
b.							
c.							
7. Division 7 – Thermal & Moisture: ***|							
a.							
b.							
c.							
Roof:							
8. Division 8 – Doors & Windows: *							
a.							
b.							
c.							
9. Division 9 – Finishes: *							
a.							
b.							
c.							
10. Division 10 – Specialties: *							
a.							
b.							
c.							
11. Division 11 – Equipment: ***							
(i) Fixed or Built-in:							
a.							
b.							
c.							
(ii) Moveable:							
a.							
b.							
c.							
12. Division 12 – Furnishings: ***							
(i) Fixed or Built-in:							
a.							
b.							
c.							
(ii) Moveable:							
a.							
b.							
c.							
13. Division 13 – Special Construction: *							
a.							
b.							
c.							
14. Division 14 – Conveying Systems: *							
a.							
b.							
c.							
15. Division 15 – Mechanical: ******							
(i) Building							
a.							
b.							
c.							
(ii) Infrastructure							
a.							
b.							
c.							
16. Division 16 – Electrical: **							
(i) Building							
a.							
b.							
c.							

(ii) Infrastructure a. b. c. 17. Division 17 – Special Inspections: ** (i) Building a. b. c. (ii) Infrastructure a. b. c. (iii) Documents							
A. Total Amount of original contract							
B. Plus or minus total previously approved C. O.'s Nos.---------- incl.							
C. Plus or minus C. O.'s Nos.----------incl. approved during period covered by this est.----------							
D. Total Net Adjusted Amt.							

NOTES: The following breakdowns must be accomplished in order to comply with Government Accounting requirements. Upon completion of the Project, the final Application for Payment must show all divisions and sections, and a Final Certification of Costs for Capital Asset Accounting completed and submitted with the Application for Final Payment.

*** Report Items in each division, by CSI division and such other breakdown as is useful to the Contractor or Contract Compliance Specialist.**

**** These items must be broken down into 2 categories, (i) Building and (ii) Infrastructure, reported by specification section. Infrastructure for these purposes is defined as everything outside a line five feet from the building footprint.**

***** These items must be broken down into 2 categories; (i) fixed equipment & furnishings and (ii) Moveable equipment & furnishings and reported by specification section.**

****** Division 15 – Mechanical. This item must be broken down into 2 categories, (i) Building and (ii) Infrastructure, reported by specification section. Chillers and HVAC units that serve the facility are to be included as a part of the Building, even if they are outside the 5-foot limit. Chillers and HVAC units that are outside the 5 foot limit and serve more than one facility, such as equipment used in a central plant, are to be included in Infrastructure.**

******* Division 7 – Thermal & Moisture Components of the Roof system should be reported as a separate line item. Generally, this includes components of Sections 7500 and 7600.**

SUMMARY OF MATERIALS STORED

In support Application for Payment No.

Project No._____ Period Ending:

Contractor:

ITEM NO.	NAME (Contractor or Subcontractor)	TYPE OF MATERIAL	QUANTITY	AMOUNT (Dollars)
		TOTALS		

Prepared by_____ for
(Contractor)

Date_____, and certified by him to be a true and accurate statement.

Checked:

By:
Contract Compliance Specialist

Date:

SUBCONTRACTOR RETAINAGE RELEASE CERTIFICATE

(To be Originated by Subcontractor

TO: Board of Regents of the University System of Georgia
_____
_____

RE: Project Name and Number:_____:
Certificate Regarding Subcontractor's Completed Work and Retainage Release

1. This is to certify that our work is one hundred percent complete for our subcontract number _____. Our retainage is due in accordance with the contract documents. Our scope of work included the _____. The total amount of retainage now due is $_____.

2. The Subcontractor hereby certifies that all work required under the above contract has been performed in accordance with the terms thereof, that all materialmen, subcontractors, mechanics, and laborers have been paid and satisfied in full, and that there are no outstanding claims of any character (including disputed claims or any claims to which the subcontractor has or will assert any defense) arising out of the performance of the contract which have not been paid and satisfied in full except as listed hereinbelow, which exceptions apply only to the release in Paragraph 5, below:

[Enter: "None" or List or Make Reference & Attach Exhibit A.]

3. The Subcontractor further certifies that to the best of his knowledge and belief there are no unsatisfied claims for damages resulting from injury or death to any employees, subcontractors, or the public at large arising out of the performance of the contract, or any suits or claims for any other damage of any kind, nature, or description which might constitute a claim or lien upon the property of the Owner.

4. The Subcontractor has received final payment in full settlement of all claims against the Owner arising under or by virtue the contract, and acceptance of such payment is acknowledged as a release of the Owner from any and all claims arising under or by virtue of the contract. This release includes any claims set forth or excepted in Paragraph 2 above.

5. [*Strike out if not applicable*] The Subcontractor has received final payment in full settlement of all claims against the Contractor arising under or by virtue the contract, and acceptance of such payment is acknowledged as a release of the Contractor from any and all claims arising under or by virtue of the contract except as set forth in Paragraph 2 above.

6. Payments pursuant to this certificate shall in no way diminish, change, alter or affect the rights of the Owner under the contract documents.

SUBCONTRACTOR:

By:_____ Date:

CONTRACTOR:

By:_____ Date:

DESIGN PROFESSIONAL:

By:_____ Date:

NOTICE: OWNER MUST RECEIVE A COPY WITH ALL ORIGINAL SIGNATURES.

FINAL CERTIFICATION OF COSTS
FOR CAPITAL ASSET ACCOUNTING

Date: _____

To: _____ (Owner)

The following accounting of costs for Project No. _____ , Project Name: _____

_____ at _____

is submitted as follows, with the breakdown of costs as specified in the Final Pay Request attached hereto and incorporated herein, for the purposes of capital asset accounting pursuant to GASB 34 Accounting Statements:

1. **BUILDING AND BUILDING IMPROVEMENTS: *** **$** _____

2. **INFRASTRUCTURE: **** **$** _____

3. **FURNISHINGS AND EQUIPMENT: ***** **$** _____

==========

TOTAL: **$** _____

Notes: (Contractor must insure costs from all Change Orders are apportioned and included in each line item above)
* ***Building**:* Include totals from Items A, 1, 3, 5, 6, 7, 8, 9, 10, 13, 14, 15 and "Building" portions of Items 2, 4, and 16.
** ***Infrastructure**:* Include totals from the "Infrastructure" portions of Items 2, 4 and 16.
*** ***Furnishing and Equipment*** : Include totals from only the "moveable" portions of Items 11 and 12.

I certify to the best of my knowledge and belief that all of the amounts set forth on this Certificate are true and correct and are supported by the financial records for this project on file with the Contractor.

Contractor_____ By: _____

Date_____ Title: _____

CERTIFICATE OF THE DESIGN PROFESSIONAL

I certify to the best of my knowledge, information and belief that the amounts certified by the Contractor are consistent with the estimates provided in my final Statement of Probable Cost for the Project; that the Building Improvement contains a footprint based upon a line 5 feet outside the building structure) of _____ square feet, a total of _____ gross square feet, and contains _____ floors (including basements). The building fire protection system is _____ (include type of system). The Certificate of Occupancy was issued on _____. I further certify that the design intent for this project is that the Building and Building Improvements are of Building Construction Class _____ and ISO Occupancy Type(s) _____ and have an expected useful life of _____ years from the date of this Certificate, and that my observations of the construction confirm these expectations. (*See* Exhibit J of Design Professional Contract.)

Name_____Design Professional. Date: _____

CERTIFICATE OF THE USING AGENCY OR OWNER

I certify that to the best of my knowledge, information, and belief that the cost of the real property covered by this project, to the boundaries on the final Site Plan, was $ _____and the cost of additional government-supplied furnishings and equipment acquired for this Project was $ _____
.

Name_____ Title: _____. Date: _____

Supplementary Conditions
Georgia State University

Date:

Project Name: **Urban Life Building, School of Public Health 2nd Floor Renovations**

Project Number: **010-124-18**

SUP-01 Owner's Representative, Using Agency's Representative. Add the following to Paragraphs 6, 1.1.1.3.4 and 1.1.1.3.5 of the Construction Contract: Owner's Representative and Using Agency's Representative: - For this contract, the on-site Owner's Representative and Using Agency's Representative is the Project Manager, Design and Construction Services, Georgia State University.

SUP-02 Project Administration.

1. All documentation required by the specifications to be submitted to the "Owner" shall be routed through the Owner's Representative.

2. Changes in the *contract* (including contract sum, time, scope or conditions) shall be authorized, in writing via Change Order solely by the Owner and/or the Owner's Representative prior to execution of the work. The Contractor shall disregard all non-emergency instructions from persons other than the Owner or the Owner's Representative.

3. The Contractor shall bear all costs incurred by his failure to comply with the contract documents.

SUP-03 Smoking Prohibited on GSU Campus Smoking and tobacco use of any kind is prohibited on all Georgia State-owned or leased locations, indoors and outdoors, in garages and parking lots, and in all Georgia State-owned or leased vehicles. The university also prohibits smoking and tobacco use within 25 feet of all Georgia State building entrances and exits.

SUP-04 Inspection of Facilities for Pre-Existing Conditions

1. The Contractor shall give notice in writing to the Owner's Representative prior to commencing work for the purpose of arranging for joint inspection by the Contractor, the Owner's Representative and the Design Professional of the project facility or site, during the course of which inspection the parties to the joint inspection shall prepare a schedule identifying and showing the location of any damage to the existing work which is ascertainable by visual inspection. The schedule shall be shall be dated and signed on behalf of each party to the joint inspection. An executed and dated copy shall be filed with Contractor, Owner's Representative, and Design Professional.

2. It is agreed that the preparation of this schedule is for the benefit of the Contractor and is intended to record visually ascertainable damage to existing construction. Subsequent to the signing of this schedule, the Contractor shall be responsible for repairing all damage to existing work not included on schedule; except that the Contractor shall not be responsible for repairing any existing damage which was not ascertainable by visual inspection or which was not the result of negligence on his part. The Contractor shall have no responsibility to repair any damage which is included on the schedule.

SUP –05 Pre-Construction Meeting with Owner's Representative. After award of the contract, a pre-construction meeting shall be held at Georgia State University between the Owner's Representative, Contractor, and Design Professional to review the project and set up the approximate work sequence schedule, and to review these Supplementary General Conditions.

SUP -06 Access to Premises

1. Ingress and egress shall be limited to the most direct access to the subject work areas, roofs, mechanical rooms and equipment, or project site. No vehicles or material shall be located, even temporarily, so as to hinder normal campus functions. Any debris dropped or tracked outside of areas in which work is being performed shall be immediately cleaned up.

2. The Contractor shall obtain and pay for all city permits for blocking or impeding lanes of traffic or sidewalks while making deliveries and/or in conjunction with work.

SUP-07 Security of Building. The Contractor shall be responsible for keeping any area of the building or project site where the Contractor is doing work locked and secured whenever the area is not occupied by the Contractor's personnel, and for keeping the building or project site locked and secured when not occupied by the Owner. If construction keying is included in work scope, Contractor shall furnish key to Georgia State University Police Department for emergency use.

SUP-08 Bond Requirements. Performance bonds, payment bonds, and bid bonds are not required for construction bids less than $50,000.00 (Excluding all deductive alternates).

SUP-09 Protection of Public From Injury -Safety Plan

1. Due to the campus remaining open during construction and due to the large number of University personnel in the vicinity of the construction area, the Contractor is required to exercise special care in protecting the public from injury during all phases of the work. The Contractor shall provide adequate protective barriers to restrain public access to hazardous areas.

2. Within ten (10) calendar days of receipt of the Notice of Intent to Award contract, the Contractor must file the following with the Owner's Representative: A Health and Safety Plan to cover the scope of the work defined by the Contract: The minimum requirements for an acceptable Health and Safety Plan are covered in the Health and Safety Plan Outline (See attachment at the end of this section).

SUP-10 Sanitation. The Contractor, at the discretion of the Owner's Representative, will be allowed the use of existing toilets in the building (renovation projects only) provided such facilities are left in a clean and sanitary condition.

SUP-11 Storage Areas

1. **C**ontractor may store materials in the unoccupied work areas of the building, but only at times when it does not interfere with construction in the space, and may store materials within the boundary of the other construction materials storage areas defined on the Drawings. At completion of the work, all material and debris shall be removed from all areas.

2. Storage: All materials not used at the end of each day shall be returned to the designated storage areas.

3. Adjacent Areas: The Contractor is cautioned pertaining to the proper storage of material. Job sites are typically located in the center of the campus, with student and faculty traffic around all sides. Material shall not be stacked to hinder pedestrian or vehicular traffic. No material shall be allowed in areas where work is not being performed except as otherwise designated on the Drawings.

SUP-12 Trash Disposal. The following supplements Paragraph 3.1.7: The Contractor shall allow no trash or debris to accumulate and shall remove same from within the building or project site each day when the Contractor's employees have left the premises and shall remove same from the overall work area and storage areas at the end of each work week. Flammable trash or materials, such as paints and solvents, shall be removed at the end of each workday. All building material and trash shall be disposed of legally off the campus. Burning of material on the site shall not be permitted.

SUP-13 Parking. No parking is available on University premises for Contractor or employee vehicles, unless other arrangements are made with the Owner's Representative.

SUP-14 Securing of Work Area. Provide means for securing the work areas within the project site when the Contractor's employees have left the premises.

SUP-15 Use of Owner's Utilities. Delete Paragraph 1.7.6 and replace with the following: For renovation projects only, the Owner agrees to provide at no cost to the Contractor service from the existing utilities in the building for the execution of the work. The Contractor shall exercise conservation in the use of the Owner's utilities to prevent waste. Contractor is required to protect Owner's equipment such as panel boxes, circuit breakers, and to replace same at no cost to the Owner should they become damaged or broken. The Contractor shall not use University telephones or data networks.

SUP-16 Interruption of Building Systems

1. HVAC: : The Contractor shall give notice to the Owner's Representative at least fifteen (15) calendar days in advance of the date on which he wishes to interrupt HVAC service to the building or portions thereof. The duration of each separate interruption shall not exceed four (4) hours. No interruptions may take place except on weekends between the hour of 6:00 a.m. on Saturdays and the hour of 9:00 p.m. on Sundays. The Contractor may otherwise interrupt service at any

time and duration **provided that written permission from the Owner's Representative to do so has been obtained by the Contractor.**

The Owner's Representative may restrict interruptions otherwise PROVIDED: that in such event there shall be an adjustment in the work schedule; and PROVIDED FURTHER: that there shall be no restrictions otherwise except in an emergency affecting the safety of property, health, or life.

2. Domestic Water: The Contractor shall give notice to the Owner's Representative at least fifteen (15) calendar days in advance of the date on which he wishes to interrupt Domestic Water service to the building or portions thereof. The duration of each separate interruption shall not exceed four (4) hours. No interruptions may take place except on weekends between the hour of 6:00 a.m. on Saturdays and the hour of 9:00 p.m. on Sundays. The Contractor may otherwise interrupt service at any time and duration **provided that written permission from the Owner's Representative to do so has been obtained by the Contractor.**

The Owner's Representative may restrict interruptions otherwise PROVIDED: that in such event there shall be an adjustment in the work schedule; and PROVIDED FURTHER: that there shall be no restrictions otherwise except in an emergency affecting the safety of property, health, or life.

3. Sprinkler Fire Protection System: The Contractor shall give notice to the Owner's Representative and to the City of Atlanta Fire Department at least fifteen (15) days in advance of the date on which he wishes to interrupt fire protection service to the building. The duration of each separate interruption shall not exceed eight (8) hours. No interruption may take place except over weekends between the hour of 6:00 a.m. on Saturdays and the hour of 9:00 p.m. on Sundays. The Contractor may otherwise interrupt services at any time **provided that written permission from the Owner's Representative to do so has been obtained by the Contractor.**

The Owner's Representative may restrict interruptions otherwise PROVIDED: that in such event there shall be an adjustment in the work schedule; and PROVIDED FURTHER: that there shall be no restrictions otherwise except in an emergency affecting the safety of property, health, or life.

4. Storm Service and Waste Service: The Contractor shall give notice to the Owner's Representative at least seven (7) calendar days in advance of the date on which he wishes to interrupt waste and storm sewer service. For waste, no interruptions may take place except over weekends between the hour of 6:00 a.m. on Saturdays and the hour of 6:00 p.m. on Sundays.

For storm sewer, the interruptions may occur during working hours providing that the weather forecast does not anticipate rain. Only work which can be accomplished on one day may be undertaken unless provisions for temporary connections for the storm sewer are accomplished if overnight interruptions are necessary. The Contractor may otherwise interrupt service at any time **provided that written permission from the Owner's Representative to do so has been obtained by the Contractor.**

The Owner's Representative may restrict interruptions otherwise PROVIDED: that in such event there shall be an adjustment in the work schedule; and PROVIDED FURTHER: that there shall be no restrictions otherwise except in an emergency affecting the safety of property, health, or life.

5. Electricity: The Contractor shall give notice to the Owner's Representative at least fifteen (15) calendar days in advance of the date on which he wishes to interrupt electrical service to the building or portions thereof. The duration of each separate interruption shall not exceed eight (8) hours. No interruptions may take place except over weekends between the hour of 11:00 p.m. on Fridays and the hour of 6:00 p.m. on Sundays. The Contractor may otherwise interrupt service at any time and duration **provided that written permission from the Owner's Representative to do so has been obtained by the Contractor.**

The Owner's Representative may restrict interruptions otherwise PROVIDED: that in such event there shall be an adjustment in the work schedule; and PROVIDED FURTHER: that there shall be no restrictions otherwise except in an emergency affecting the safety of property, health, or life.

6. Fire Alarm System: The Contractor shall give notice to the Owner's Representative at least fifteen (15) days in advance of the date on which he wishes to interrupt fire alarm system service to the building. The duration of each separate interruption shall not exceed eight (8) hours. No interruptions may take place except over weekends between the hour of 6:00 a.m. on Saturdays and the hour of 9:00 p.m. on Sundays. The Contractor may otherwise interrupt service at any time **provided that written permission from the Owner's Representative to do so has been obtained by the Contractor.**

The Owner's Representative may restrict interruptions otherwise PROVIDED: that in such event there shall be an adjustment in the work schedule; and PROVIDED FURTHER: that there shall be no restrictions otherwise except in an emergency affecting the safety of property, health, or life.

SUP -17 Existing Facilities to Remain Operational and Accessible. The following supplements Paragraph 1.7.4: Coordination with the Owner to determine acceptable work areas is critical to the completion of this project in the time scheduled. Corridors, stairs and other exit ways shall remain in use and kept passable and free of debris and stored material at all times. Adjacent parking areas shall remain usable by tenants at all times except as otherwise arranged with the Owner's Representative. When work is not physically being performed, these areas shall be free of material, equipment and debris of the Contractor. Interruptions to school functions shall be kept to a minimum. Adequate air conditioning, heating and lighting shall be maintained in all occupied spaces except as agreed upon with the Owner's Representative.

SUP -18 Possible Exposure to Hazardous Materials. In the scope of performing the work, the Contractor's employees could be exposed to hazardous materials. The Contractor shall determine what safety measures and precautions are necessary for their employees to safely work in areas of concerns. The Contractor is fully responsible for the safety of their employees, including notifying employees of possible hazards. This includes, but is not limited to, determining and providing the appropriate safety equipment for their employees to safely work in area of concern.

SUP -19 Elevators. The following supplements Paragraph 1.7.4:

1. University elevators may be used for material movement only with permission of the Owner's Representative following an inspection of the facilities for pre-existing conditions in accordance with Supplementary General Conditions Paragraph SUP-04. The Owner reserves the right to restrict Contractor's material movement use to non-business hours when any part of the building is occupied. Elevators shall be kept clear of debris and hazards at all times and shall be given a thorough cleaning at the end of each day's use. The Contractor shall be responsible for cost of repair and/or replacement of all damage to elevator finishes and equipment occurring during the period of Contractor's use. Confirm the maximum load capacity of the freight elevator with the Owner's representative. Contractor shall protect the elevator interiors if elevators are utilized.

2. The Contractor shall take digital picture(s) showing the condition of elevator cab prior to start of Construction. The elevator cab walls shall be protected with a self supporting 2" X 2" frame with styrofoam insulation within the frame then a masonite or plywood cover. Do not penetrate any elevator components with fasteners. Protect floor with wall-to-wall, non-skid, hard-rubber floor mat or carpet over masonite. At the entrance to the elevator lobby provide a wet and a dry walk-off mat to prevent any dust or debris from tracking to the rest of the building.

3. Prior to 0630 hours, Contractor shall complete cleaning of all surfaces. Area shall be re-checked and cleaned, as necessary, during work day. Contractor shall be responsible for cleaning all dust and debris from other areas of the building should it be determined by the Owner that it is a result of the construction project. If any damage is done by the Contractor then the Owner shall get the repair work done by the current elevator contractor, retained by the Owner, for maintaining all campus elevators. The Owner shall back charge the project construction Contractor for the cost.

4. The Owner's definition of "clean" for elevator cabs includes but is not limited to the following: 1) no loose debris on floor or in elevator door tracks, 2) no soiled walls, 3) polished stainless steel, and 4) floor and door surfaces clean of footprints, handprints and streaks. The Owner's definition of "clean" for elevator lobbies includes but is not limited to the following: 1) no loose debris or dust, 2) floors swept and mopped, or carpet vacuumed clean, and 4) the floor and door clean of footprints, streaks and handprints.

5. At or about 0630 hours, the Owner's representative will check these areas. If conditions are not acceptable, the Contractor will be called to respond and provide adequate cleaning of the areas. If conditions are not corrected by 0700 hours, the Owner's representative will provide for the cleaning; but, the Contractor shall be back charged. The decision by Owner to take responsibility to clean the affected areas is final. The Contractor shall be charged $100 per elevator lobby and $50 per elevator cab.

SUP-20 Phasing of the Work. Not applicable.

SUP-21 Existing Furniture. The contractor shall coordinate the removal, temporary storage, and return and set-up of all existing furniture and equipment within the Scope of Work for this project that requires removal. The contractor shall also be responsible for providing full protection of any furniture and equipment that is to remain on site. Any and all costs associated with this activity shall be borne by the Contractor.

SUP-22 Contractor Coordination with Regulating Bodies. The contractor shall coordinate with the City of Atlanta any project specific permits and restrictions thereof including closure of city streets for crane operation. In addition, if other means of lifting equipment and materials to the roof are utilized, the contractor shall coordinate the efforts with all associated governing bodies. Any and all costs associated with permits, temporary closing of streets and securing local law enforcement shall be borne by the Contractor.

SUP-23 Cutting or Coring. During regular building occupied hours, the contractor shall keep dust and noise to a minimum; therefore, cutting, coring, chipping or any similar method of modifications to the building structure shall be prohibited from 9AM to 6PM on Monday through Thursday and from 9AM to 5PM on Fridays. Prior to coring any slabs or masonry/concrete walls, contractor will be

required to perform scanning in order to ensure that no rebar, tensioning cables, conduit, etc. are cut. If any such damage occurs, contractor will be required to repair same at their own cost. All cores are to remain on site.

SUP-24 Contractor Qualifications.

This work requires special construction expertise that must be verified through documented experience. Therefore, any General and/or Sub-Contractor submitting a bid for this scope of work must confirm that he has completed similar work as follows:

- Bidding contractors must have experience with full building lighting retrofits.

  Experience outlined in paragraphs above must be demonstrated by projects which are complete prior to the bid date for this work.

SUP-25 Small Business and Minority Vendor Designee. The Board of Regents of the University System of Georgia by and on Behalf of Georgia State University has appointed a Small Business Liaison designee to act as liaison with small business and minority vendors. For more information, please contact Georgia State University's Purchasing Department by phone at 404-413-3150.

SUP-26 Term Clarification. Every reference in the General Requirements of the Construction Contract document to the term General Conditions or to the term Supplementary General Conditions shall mean General Requirements or Supplementary General Requirements, respectively.

SUP-27 Items Deleted. The following paragraphs are omitted: 1.7.5, Office for Contract Compliance Specialist (CCS).

SUP-28 In Section 1.1.7.2, change portion of sentence reading "up to twenty-five sets … format." to "one electronic copy of completed Contract Document."

SUP-29 Add to Section 01-3216, Construction Progress Schedule: Schedules shall be CPM-based, similar to Primavera or Microsoft Project.

SUP-30 Add to Section 1.1.7.3: Contractor will furnish two, hard-copies and one, electronic copy in USB format of "as-built" drawings and all O&M manuals. For all other required documents, the contractor will furnish one, hard-copy and one, electronic copy.

SUP-31 Make the following changes to 3.2.8 Cost allowable for changes to the work, allowances for contractor and permissible expenditures:

- *Section 3.2.8.1.1 Contractor If the contractor does all or part of the changed work with employees that work directly for the contractor, its markup for overhead and profit on the changed work the contractor performs with its employees shall be twenty percent of the net allowable costs.*
- *Section 3.2.8.1.1* ***Delete*** *"twenty five percent of the first $50,000 of the net allowable costs".*
- *Section 3.2.8.1.2 Subcontractor If a subcontractor does all or part of the changed work with employees that work directly for the subcontractor, the subcontractors markup for overhead and profit on the work, the subcontractor performs with its employees shall be twenty percent of the net allowable costs.*
- *Section 3.2.8.1.2* ***Delete "****twenty five percent of the first $50,000 of the net allowable costs."*
- *Section 3.2.8.1.3 Contractors mark up on subcontractors work. The contractor's management mark up on the subcontractors net additional allowable expenditures shall be seven and one half percent. The contractor shall not be permitted the overhead and profit mark up on Time Dependent Overhead Costs.*
- *Section 3.2.8.1.3* ***Delete*** *"but shall be permitted a management mark up of five percent on Time Dependent Overhead Costs."*
- *Section 3.2.8.1.4 – Second and lower Tier Subcontractor If a subcontractor at any tier does all or part of the changed work with its employees, the subcontractor's markup on the subcontractors work with its employees shall be twenty percent of the cost. The management mark up of a subcontractors work by the contractor and all intervening tiers of subcontractors shall not exceed seven and one half percent for the contractor and any subcontractor, or a total of fifteen percent for the changes to the work.*
- *Section 3.2.8.1.4* ***Delete*** *" twenty five percent of the first $50,000 of the cost."*

SUP-32 Delete Section 3.2.9.7

SUP-33 Contractor Conduct – While on Georgia State University (hereinafter "University") or Georgia State University Foundation (hereinafter "Foundation") property, Contractor, its employees, subcontractors, agents and invitees (hereinafter referred to collectively and individually as "Contractor") agrees to comply with all applicable state, federal and/or city laws and regulations. Further, Contractor agrees to comply with all University policies and procedures, and refrain from any inappropriate conduct at all times. Inappropriate conduct includes, but is not limited to, cat-calling, whistling and/or harassment of any kind directed towards University students, faculty, staff, visitors and/or members of the general public. Contractor expressly acknowledges and agrees that smoking is prohibited on University and Foundation property. Any violations of these provisions will be reported to the proper authorities.

[Remainder of page intentionally left blank.]

Georgia State University
Health and Safety Plan Outline
(Minimum Requirements)

- Name and telephone number(s) of the person responsible for safety on this project. (This must be a 24-hour number through the duration of the project.)

- A list of all hazardous materials to be used for the project, plus the projected amounts of the material to be onsite at anyone time.

- Material Safety Data Sheets (MSDS) for all hazardous materials to be used. This includes, but is not limited to , all cleaning supplies, lubricants, oils, solvents, glues, adhesives, plastics, paints, varnishes, and any other material to be used on the project.

  Note: No hazardous material(s) are to be brought onsite until the Department of Safety and Risk Management has reviewed the MSDS for each. Any additional hazardous material(s), not initially listed, but needed to complete the project, shall be reviewed by the Department

- Control measures that will be used by the contractor to protect both the contractor's employees and Georgia State University's employees and students for each hazardous material to be brought onsite,

- Fire suppression methods to be employed, Include types of fire suppression equipment to be available on site for use by the contractor’s employees.

- A copy of Contractor's Hazardous Communication Program.

- A list of Personal Protective Equipment (PPE) to be used by contractor's employees. A copy of Contractor's PPE Program.

- Measures that will be used by the contractor to control the migration of potentially harmful dusts and fumes that could be generated in building and renovation projects to other parts of Georgia State University properties.

- Emergency procedures to be used by the contractor in the event of an accident.

- Decontamination procedures to be used by contractor.

- Disposal methods of all contaminated materials such as, but not limited to, chemically contaminated PPE, rags, empty containers, and/or unused materials. Specifically, how will the contractor handle their hazardous waste?

- The Hazardous Waste EPA Identification Number of the contractor.

END OF SUPPLEMENTARY GENERAL CONDITIONS

SECTION 01 1000 - SUMMARY

PART 1 GENERAL

1.01 WORK BY OWNER

A. Items noted NIC (Not In Contract) will be supplied and installed by Owner before Substantial completion.

1.02 OWNER OCCUPANCY

A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.

B. Owner intends to occupy the Project upon Final Completion.

C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

D. Schedule the Work to accommodate Owner occupancy.

1.03 CONTRACTOR USE OF SITE

A. Construction Operations: Limited to areas shown on the Drawings..

B. Arrange use of site and premises to allow:
   1. Owner occupancy.
   2. Work by Owner or by others.
   3. Use of site and premises by the public.

C. Provide access to and from site as required by law and by Owner.

D. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.

E. Do not obstruct roadways, sidewalks, or other public ways without permit.

F. Utility Outages and Shutdown
   1. Limit disruption of utility services to hours when the building is unoccupied and when approved by the Owner.
   2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without notice to and approval from the Owner. Secure the approval of authorities having jurisdiction when required.
   3. Prevent accidental disruption of utility services to other facilities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2200 - UNIT PRICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. List of unit prices, for use in preparing Bids.

B. Measurement and payment criteria applicable to Work performed under a unit price payment method.

1.02 UNIT QUANTITIES SPECIFIED

A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

1.03 MEASUREMENT OF QUANTITIES

A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.

B. Assist by providing necessary equipment, workers, and survey personnel as required.

C. Perform surveys required to determine quantities, including control surveys to establish measurement reference lines. Notify Architect prior to starting work.

1.04 PAYMENT

A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.

B. Payment will not be made for any of the following:
   1. Products wasted or disposed of in a manner that is not acceptable.
   2. Products determined as unacceptable before or after placement.
   3. Products not completely unloaded from the transporting vehicle.
   4. Products placed beyond the lines and levels of the required Work.
   5. Products remaining on hand after completion of the Work.
   6. Loading, hauling, and disposing of rejected Products.

1.05 SCHEDULE OF UNIT PRICES

A. Moisture-Resistant Sealer-Surfacer.
   1. Section 09 0561 - Preparation of Concrete to Receive Adhesively Installed Flooring.
   2. Measurement: Plan quantity, work in place.
   3. Payment: Per square foot.
   4. Include the following quantity in the Base Bid: 0 SF.

B. Standard Flooring Adhesive for Resilient Flooring.
   1. Section 09 6500 - Resilient Flooring.
   2. Section 09 0561 - Preparation of Concrete to Receive Adhesively Installed Flooring.
   3. Measurement: Plan quantity, work in place.
   4. Payment: Per square foot.
   5. Include the following quantity in the Base Bid: 100% of the area to receive resilient flooring.

C. Moisture-Resistant Flooring Adhesive for Resilient Flooring.
   1. Section 09 6500 - Resilient Flooring.
   2. Section 09 0561 - Preparation of Concrete to Receive Adhesively Installed Flooring.
   3. Measurement: Plan quantity, work in place.

4. Payment: Per square foot.
5. Include the following quantity in the Base Bid: 0 SF.

D. Standard Flooring Adhesive for Carpet.
1. Section 09 6800 - Carpet.
2. Section 09 0561 - Preparation of Concrete to Receive Adhesively Installed Flooring.
3. Measurement: Plan quantity, work in place.
4. Payment: Per square foot.
5. Include the following quantity in the Base Bid: 100% of the area to receive carpet.

E. Moisture-Resistant Flooring Adhesive for Carpet.
1. Section 09 6800 - Carpet.
2. Section 09 0561 - Preparation of Concrete to Receive Adhesively Installed Flooring.
3. Measurement: Plan quantity, work in place.
4. Payment: Per square foot.
5. Include the following quantity in the Base Bid: 0 SF.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 3300 - SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedural requirements for submittals for review, information, and project closeout.

B. Timing and packaging of submittals.

C. Delivery of submittals.

1.02 ELECTRONIC DELIVERY OF PROJECT CORRESPONDENCE

A. Where electronic delivery of documents is required or permitted, deliver electronic documents to the Architect via "NewForma Info Exchange" provided by the Architect at no cost to the Contractor.

B. Where pdf format is required, create pdf documents using standard text/graphic conversion software such as Adobe or Bluebeam and employ bookmarks throughout the document for ease of navigation; manually scanned documents are not acceptable.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 SUBMITTALS FOR REVIEW

A. Product Data Submittals: Submit manufacturer's standard published data necessary to demonstrate compliance with specified requirements. Mark each copy to identify applicable products, models, options, and other data. If necessary, supplement manufacturer's standard data with information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

D. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.
   5. Other types indicated in respective specification sections.

E. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents. Architect's review is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

F. Contractor is responsible for determining and verifying materials, field measurements and field construction criteria related thereto, and checking and coordinating the information contained within the submittal with the requirements of the Work and of the Contract Documents.

G. Samples will be reviewed only for aesthetic attributes such as color and texture.

3.02 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated in respective specification sections.

B. Submit for Architect's delivery to Owner.

C. Action taken by the Architect (whether "approval" or other action) indicates only that the item has been received in the form required by the contract documents and that the Architect will transmit the item to the Owner for the Owner's records, but does not indicate that the Architect has verified the accuracy or adequacy of the contents of the submittal.

3.03 SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual sections, submit them at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

B. Submit for Owner's benefit during and after project completion.

C. Action taken by the Architect (whether "approval" or other action) indicates only that the item has been received in the form required by the contract documents and that the Architect will transmit the item to the Owner for the Owner's records, but does not indicate that the Architect has verified the accuracy or adequacy of the contents of the submittal.

3.04 TIMING AND PACKAGING OF SUBMITTALS

A. Submit complete, coordinated data. Partial submittals are not acceptable unless specifically exempted. For complex assemblies comprising components from two or more Specifications Sections, submit data for all components of the assembly as a single, coordinated package.

B. Initial Product Information: Submit the initial product information listed below for each Section of the Specifications as a single package.
   1. Product data.
   2. Samples.
   3. Installer and manufacturer qualifications.
   4. Manufacturer's instructions.
   5. Certificates, test reports, and inspection reports of standard plant runs that demonstrate compliance of proposed products with specified quality.
   6. Similar submittals demonstrating quality of proposed products.

C. Shop Drawings and Design Data:

1. Submit Shop Drawings and Design Data for each Section of the Specifications as a single package.
    a. Exception: When approved by the Architect especially large quantities of drawings on large projects may be divided into individual submissions, such as package 1, 2, 3, etc.
2. Submit the following prior to placing final order for fabrication:
    a. Detailed drawings prepared specifically for the project, for example drawings of concrete reinforcing, structural steel, curtain wall, equipment.
    b. Calculations or other designs prepared specifically for the project.

D. In-Progress Reports: Multiple submittals permitted. Submit the following in a timely manner as the work progresses.
1. Certificates, test reports, and inspection reports of actual plant runs for this project (where required) or of tests and inspections made at the project site (earthwork, concrete, steel, etc.).
2. Similar submittals recording actual quality installed on-site.

E. Closeout Submittals: Submit the following for each Section of the Specifications as a single package:
1. Final certificates, test reports, and inspection reports of completed work.
2. Project record documents.
3. Operation and maintenance data.
4. Warranties and bonds.
5. Similar submittals attesting to completed work.

3.05 DELIVERY OF SUBMITTALS

A. Initial Product Information, Shop Drawings, Design Data, and In-Progress Reports:
1. Deliver documents electronically in pdf format.
2. Small Size Documents:
    a. Sheet size either 8-1/2 x 11 or 11 x 17 inches; do not submit 8-1/2 x 14.
3. Documents Larger than 11 x 17 Inches:
    a. Sheet size as necessary.

B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect. If not specified in individual specification sections, submit two.
1. Retained samples will not be returned to Contractor unless specifically so stated.

C. Documents for Information:
1. Deliver documents electronically in pdf format.

D. Documents for Project Closeout:
1. Warranties, Bonds, and Executed Forms: Submit original (paper) executed documents plus two photocopies.
2. Testing, Balancing, Start-Up, and Operations and Maintenance Manuals:
    a. Submit number of paper copies as specified in respective specification sections. If quantity is not so indicated, submit two copies.
    b. Submit two copies of CD or DVD-ROM format disks containing pdf files that are indexed and organized by specification section.

E. Submittal Procedures:
1. Transmit each submittal with approved form.
2. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

3. Identify Project, Contractor, Subcontractor or supplier. Identify Specification Section number and pertinent drawing and detail number.
4. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
5. Text of the Contractor's stamp shall not be effective to limit or reduce the Contractor's responsibilities for review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
6. Schedule submittals to expedite the Project, and coordinate submission of related items.
7. Schedule submittals for orderly review by the Architect. For each submittal for review, allow 15 days plus delivery time to and from the Contractor, unless Architect notifies Contractor that additional time is necessary for review on account of Contractor's scheduling of simultaneous submittals.
8. Identify variations from the Contract Documents.
9. Identify product or system limitations that in Contractor's view may be detrimental to successful performance of the completed Work.
10. When revised for resubmission, identify all changes made since previous submission.
11. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
12. Submittals not requested will not be processed.

3.06 FOR REQUESTS FOR SUBSTITUTION, SEE:

A. Invitation to Bid.

B. General Conditions of the Contract for Construction.

C. Section 01 6000 - Product Requirements.

D. Section 01 6201 - Pre-Bid Substitution Request.

END OF SECTION

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Control of installation.

C. Tolerances.

D. Manufacturer's field services.

1.02 SUBMITTALS

A. Manufacturer's Field Reports: Submit reports for Architect's information and benefit as contract administrator.

1. Submit reports within 7 days of observation to Architect.

1.03 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue specified in individual specification sections or, if none, the date current on the date of issue of the Contract Documents.

C. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

D. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections or when requested by the Architect, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, and testing, adjusting, and balancing of equipment, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.04 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary sanitary facilities.

B. Temporary closures.

C. Temporary field offices.

1.02 TEMPORARY SANITARY FACILITIES

A. Provide and maintain temporary toilets. Provide at time of project mobilization.

B. Maintain daily in clean and sanitary condition.

1.03 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Protect the vehicles of others, stored materials, site, and structures from damage.

1.04 INTERIOR ENCLOSURES

A. Provide temporary partitions as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.

B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces.

1.05 SECURITY

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

1.06 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site weekly.

C. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.07 FIELD OFFICES

A. Use space in the existing building for field offices.

1.08 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Storage and protection.

C. Product option requirements.

D. Substitution requirements and procedures.

1.02 RELATED SECTIONS

A. Section 01 6201 - Pre-Bid Substitution Request.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

B. Do not use products that contain 1 percent or more by weight of asbestos (asbestiform varieties of chrysotile (serpentine), crocidolite (riebeckite), amosite (cummingtonite-grunerite), anthophyllite, tremolite, or actinolite)) .

2.02 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description, and comply with the remaining requirements of the project.

B. Products Specified by Naming One or More Brand Name Products: Use one of the brand name products specified, and comply with the remaining requirements of the project.

C. Products Specified by Naming One or More Manufacturers: Use products of one of the manufacturers specified, and comply with the remaining requirements of the project.

D. Products Specified by Naming a "Basis of Design": Use the product named as "basis of design" or obtain the approval of the Architect of specific products by other manufacturers listed in the specification, following the procedures specified for substitutions.

2.03 MANUFACTURER QUALIFICATIONS AND INSTALLER QUALIFICATIONS

A. The qualifications for manufacturers and for installers specified in the respective specification sections are requirements of the Contract.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. For time restrictions on substitution requests see the Invitation to Bidders and the General Conditions.

B. Approval of substitutions after the award of contract may occur only by Contract Modification.

C. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals without separate written request complying with the requirements specified herein.

D. Substitution Submittal Procedure:

1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
2. Accompany requests during the bidding period with a completed Pre-Bid Substitution Request as specified in Section 01 6201.

3. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
4. Accompany requests after the receipt of bids with complete documentation of cost (whether cost will increase, decrease, or remain the same) for both the specified item and the proposed item. Provide full information required for evaluation:
    a. Quantities of materials and the cost thereof, including shipping to the site.
    b. Manhours of labor and hourly cost including payroll taxes, insurance, and benefits for each skill or labor classification.
    c. Quantities and costs of equipment, tools, and other material not incorporated into the work.
    d. Overhead and profit.
    e. Credit for deletions from Contract, similarly documented.
    f. Justification for any change in Contract Time.
    g. Other information requested by the Architect.
5. The Architect will notify Contractor in writing of decision to accept or reject request.

E. A request for substitution constitutes a representation that the submitter:
1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
2. Will provide the same warranty for the substitution as for the specified product.
3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension which may subsequently become apparent.

3.02 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Prevent contact with material that may cause corrosion, discoloration, or staining.

H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 6201 - PRE-BID SUBSTITUTION REQUEST

TO: LORD, AECK & SARGENT, INC.,

1175 Peachtree Street, NE, Suite 2400, Atlanta, Georgia 30361

Substitution of the following is hereby requested in accordance with the Instructions to Bidders, the General Conditions of the contract, and Section 01 6000.

SPECIFIED PRODUCT:

SECTION NO.: PAGE NO.: PARA. NO.:

REASON FOR REQUESTING SUBSTITUTION; CHECK ONE OR MORE:

[ ] Contractor cannot provide the specified product, assembly, or method of construction within the Contract Time;

[ ] The request directly relates to an “or-equal” clause or similar language in the Contract Documents;

[ ] The request directly relates to a “product design standard” or “performance standard” clause in the Contract Documents;

[ ] The requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations after deducting additional responsibilities Owner must assume;

[ ] Contractor cannot provide the specified product, assembly, or method of construction in a manner that is compatible with other materials and Contractor certifies that the substitution will overcome the incompatibility;

[ ] Contractor cannot coordinate the specified product, assembly, or method of construction with other materials and Contractor certifies they can coordinate the proposed substitution; or

[ ] The specified product, assembly, or method of construction cannot provide a warranty required by the Contract Documents and Contractor certifies that the proposed substitution provides the required warranty.

[ ] Other (explain):

PROPOSED PRODUCT INFORMATION:

Manufacturer:

Address:

Product trade name, model number, other characteristics:

Name of fabricator or supplier:

Address:

CHECK ONE:

[ ] The proposed product complies with the contract documents in every respect except for the specified manufacturer name or brand name or model number.

[ ] The proposed product material complies with the contract documents in every respect except for deviations which are as follows:

CHECK ONE:

[ ] No changes are required in other work or products if the substitute product is approved.

[ ] Changes will be required in other work or products if the substitute product is approved, as follows:

MAINTENANCE SERVICES AND REPLACEMENT MATERIAL AVAILABILITY (IF APPLICABLE):

CONTRACTOR'S CERTIFICATION

To the Owner, to the Architect, to other bidders and sub-bidders (of any tier), and to the Contractor(s) and subcontractors and suppliers (of any tier) to whom contracts are eventually awarded in connection with the project, the undersigned warrants that the undersigned:

- has examined the bidding documents for the project,

- has investigated the proposed product and has found it to be equal or superior in all significant respects to the specified product,

- will provide the same warranty for the proposed product as for the specified product,

- will coordinate the installation and make other changes which may be required for the work to be complete in all respects, including, redesign, additional components, and additional capacity required by other work affected by the change, and

- waives all claims for additional costs and time extensions which subsequently may be come apparent and which are caused by the change.

ENCLOSURES:

Complete product data, as specified in the Contract Documents, is enclosed with this request.

Other enclosures:

THIS REQUEST IS SUBMITTED IN THE NAME OF:

Company name:

Address:

Telephone:

By:

Authorized Signature:

Date:

Typed Name:

Title:

END OF SECTION

SECTION 01 7000 - EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.

C. Pre-installation meetings.

D. Cutting and patching.

E. Cleaning and protection.

F. Starting of systems and equipment.

G. Demonstration and instruction of Owner personnel.

1.02 PROJECT CONDITIONS

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

C. Rodent and Pest Control: Provide methods, means, and facilities to prevent rodents and pests and insects from accessing or invading premises.

1.03 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of work of separate sections.

G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. Notify Architect sufficiently in advance of meeting date to allow for coordination with Architect's schedule.

B. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.

C. Record minutes and distribute copies within three days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.04 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS

A. Drawings showing existing construction and utilities are not record documents or precise surveys of actual conditions.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Separate areas in which alterations are being conducted from other areas that are still occupied; provide, erect, and maintain temporary dustproof partitions of construction.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.
   2. Relocate items indicated on drawings.
   3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
   4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
   2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
   3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
      a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
      b. Provide temporary connections as required to maintain existing systems in service.
   4. Verify that abandoned services serve only abandoned facilities.
   5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

F. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

G. Adapt existing work to fit new work.

H. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.

I. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.

J. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.

K. Refinish existing surfaces as indicated:
   1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.

2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
3. Patch as specified for patching new work.

L. Clean existing systems and equipment.

M. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

N. Do not begin new construction in alterations areas before demolition is complete.

3.06 CUTTING AND PATCHING

A. Execute cutting and patching to complete the work, to uncover work in order to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit products together to integrate with other work.

B. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

C. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

D. Restore work with new products in accordance with requirements of Contract Documents.

E. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

F. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.

G. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

H. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.

I. Patch or replace surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.09 ADJUSTING

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

3.10 FINAL CLEANING

A. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.

B. Use cleaning materials that are nonhazardous.

C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces, dust and mop hard flooring.

D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

E. Clean permanent washable filters and replace disposable filters of operating equipment.

F. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

END OF SECTION

SECTION 01 7390 - INDOOR AIR QUALITY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Construction procedures to promote adequate indoor air quality after construction.

1.02 PROJECT GOALS

A. Dust and Airborne Particulates: Prevent deposition of dust and other particulates in HVAC ducts and equipment.
   1. Cleaning of ductwork is not contemplated under this Contract.
   2. Contractor shall bear the cost of cleaning required due to failure to protect ducts and equipment from construction dust.

B. Airborne Contaminants: Procedures and products have been specified to minimize indoor air pollutants.
   1. Furnish products meeting the specifications.
   2. Avoid construction practices that could result in contamination of installed products leading to indoor air pollution.

1.03 DEFINITIONS

A. Adsorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products.

B. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew, and the like, as specified.

C. Particulates: Dust, dirt, and other airborne solid matter.

D. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.

PART 2 PRODUCTS

2.01 MATERIALS

A. Low VOC Materials: See other sections for specific requirements for materials with low VOC content.

PART 3 EXECUTION

3.01 CONSTRUCTION PROCEDURES

A. Prevent the absorption of moisture and humidity by adsorptive materials by:
   1. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.
   2. Provide sufficient ventilation for drying within reasonable time frame.

B. If extremely dusty or dirty work must be conducted inside the building, shut down HVAC systems to area affected by construction only (after notifying the Owner); remove dust and dirt completely before restarting systems.

C. When working in a portion of an occupied building, prevent movement of air from construction area to occupied area.

D. HVAC equipment and ductwork may NOT be used for ventilation during construction:
   1. Provide temporary ventilation equivalent to 1.5 air changes per hour, minimum.
   2. Exhaust directly to outside.
   3. Seal HVAC air inlets and outlets immediately after duct installation.

E. Do not store construction materials or waste in existing mechanical or electrical rooms.

F. Prior to use of return air ductwork without intake filters clean up and remove dust and debris generated by construction activities.
   1. Inspect duct intakes, return air grilles, and terminal units for dust.
   2. Clean plenum spaces, including top sides of lay-in ceilings, outsides of ducts, tops of pipes and conduit.
   3. Clean tops of doors and frames.
   4. Clean mechanical and electrical rooms, including tops of pipes, ducts, and conduit, equipment, and supports.
   5. Clean return plenums of air handling units.
   6. Remove intake filters last, after cleaning is complete.

G. Do not perform dusty or dirty work after starting use of return air ducts without intake filters.

H. Use other relevant recommendations of SMACNA IAQ Guideline for Occupied Buildings Under Construction for avoiding unnecessary contamination due to construction procedures.

END OF SECTION

SECTION 02 4100 - DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

1.02 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. The Contractor shall document with photos all existing conditions of the project site and submit a copy to the Owner.

C. The Contractor shall document the condition and operation of all existing equipment to remain.

1.04 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.

PART 3 EXECUTION

2.01 SCOPE

A. Remove items indicated, for salvage and relocation.

2.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Provide, erect, and maintain temporary barriers.
   3. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
   4. Conduct operations to minimize effects on adjacent occupants.
   5. Do not close or obstruct roadways or sidewalks without permit.
   6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring as needed.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

2.03 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.

C. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. Verify that abandoned services serve only abandoned facilities before removal.
   4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

D. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

E. Existing work that is damaged during the course of the demolition shall be restored to its original condition.
   1. All damaged work shall be repaired by the Contractor at his own expense. If the Owner elects to make the necessary repairs with their own forces, the Contractor shall reimburse the Owner for the cost of such repairs.

2.04 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 06 4100 - CUSTOM CABINETS AND WOODWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Plastic Laminate Cabinets.

B. Cabinet Hardware.

1.02 REFERENCES

A. AHA A135.4 - Basic Hardboard; American Hardboard Association; 2004.

B. ANSI A208.1 - American National Standard for Particleboard; 1999.

C. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2002.

D. AWI/AWMAC (QSI) - Architectural Woodwork Standards; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2009, Edition 1.

E. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association; 2003 (ANSI/BHMA A156.9).

F. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.

1.03 SUBMITTALS

A. Product Data: Provide data for hardware accessories.

B. Product Data: Provide data for laminates.

C. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Member in good standing of the Architectural Woodwork Institute (AWI). Manufacturer listings are available at www.awinet.org/find/index.cfm.

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Protect units from moisture damage.

1.06 PROJECT CONDITIONS

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.01 SUBSTITUTIONS

A. Refer to Section 01 6000 - Product Requirements.

2.02 CABINET CONSTRUCTION

A. Perform cabinet construction in accordance with AWI Section 400 as follows:
   1. Plastic Laminate Cabinets: Custom quality.

2.03 PANEL MATERIALS

A. Particleboard: ANSI A208.1; medium density industrial type, composed of wood chips bonded with interior grade adhesive under heat and pressure; sanded faces; thickness as required; use for components indicated on drawings.

B. Medium Density Fiberboard (MDF): ANSI A208.2; composed of wood fibers pressure bonded with moisture resistant adhesive to suit application; sanded faces; thickness as required.

C. Hardboard: AHA A135.4; Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick, smooth two sides (S2S). Use for drawer bottoms, dust panels, and other components indicated on drawings.

2.04 LAMINATE MATERIALS

A. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications and as follows:
   1. Exposed Surfaces: HGS, 0.048 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
   2. Cabinet Liner: CLS, 0.020 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
   3. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

B. Surface Color and Pattern: As listed in the Finish Schedule.

2.05 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application.

B. Fasteners: Size and type to suit application.

2.06 HARDWARE

A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.

B. Door Pulls: "U" shaped wire pull, stainless steel with satin finish, 4 inch centers.

C. Catches: Magnetic.

D. Hinges: 5 knuckle type; stainless or chromium plated steel with satin polished finish.

2.07 FABRICATION - CABINETS

A. Cabinet Style: Flush overlay.

B. Cabinet Doors and Drawer Fronts: Flush style.

C. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

D. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

E. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

F. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
   1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
   2. Cap exposed plastic laminate finish edges with material of same finish and pattern.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION - CABINETS

A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

B. Use concealed joint fasteners to align and secure adjoining cabinet units.

C. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

D. Secure cabinets to floor using appropriate angles and anchorages.

E. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.03 ADJUSTING

A. Adjust installed work.

B. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 07 8400 - FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Protection of new and existing fire-resistance-rated construction and smoke barriers as required by the building code, and using materials subject to the limitations of this specification.
   1. Protection of new penetrations and construction.
   2. Inspection of existing penetrations and construction uncovered during the course of construction.

B. The location and extent of fire-resistance-rated construction and smoke barriers are indicated on the Drawings.
   1. Protect every penetration into or through such construction.
   2. Protect every joint in such construction or between elements of such construction and adjacent construction.

C. Work Not Included: Repairing penetrations made in error and repairing penetrations which are too large to be sealed by the methods indicated; these are to be repaired using the original material of the construction.

1.02 PRICE AND PAYMENT

A. Include the cost of firestopping new penetrations and construction in the base bid.

B. Include the cost of firestopping of existing penetrations and construction in the base bid where shown on the drawings, schedules, or specifications.

C. The cost of repair or renewal of non-compliant existing firestopping penetrations and construction encountered during construction will be paid for in accordance with the General Conditions that govern changes in the Work.

1.03 REFERENCES

A. ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2008b.

B. ASTM E 1966 - Standard Test Method for Fire-Resistive Joint Systems; 2009.

C. UL 1479 - Standard for Fire-Tests of Through-Penetration Firestops; Underwriters Laboratories, Inc.; 2003.

D. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; 2004.

1.04 DEFINITIONS

A. Fire Wall, Fire Barrier, Smoke Barrier, Fire Partition: As defined by the building code.

1.05 SUBMITTALS

A. Product Data: Provide data on product characteristics, performance ratings, limitations, and tested assembly details including preparation and installation instructions.

B. Shop Drawings - Schedule: Submit a single, integrated, and complete list of joints and penetrations to be sealed including penetrations caused by mechanical, electrical, plumbing, and other work. Do not submit separate schedules prepared by the various subcontractors. Identify the following:
   1. Type of penetration (floor, wall, other).
   2. Fire rating of penetrated assembly.
   3. Material of penetrated assembly (e.g., cast-in-place concrete wall, CMU wall, composite floor deck, etc.).
   4. Size and material of the penetrating object (e.g. 4"-8" C.I.P, EMT up to 2" dia., etc.).

5. Testing laboratory design number.
6. Manufacturer’s design number.

C. Preinstallation Inspection Report.

D. Final Inspection Report.

1.06 QUALITY ASSURANCE

A. Manufacturer's technical representative shall be available for initial job start-up and trouble-shooting as needed, and to assist with inspections.

1.07 REGULATORY REQUIREMENTS

A. Protect fire rated construction and smoke barriers as required by the building code, and using materials subject to the limitations of this specification. Construction to be protected includes:
1. Penetrations into or through fire walls, fire barriers, smoke barriers, and fire partitions.
2. Penetrations into or through fire-resistance-rated floors, floor/ceiling assemblies, and the ceiling membrane of roof/ceiling assemblies.
3. Penetrations in smoke barriers.
4. Joints in or between fire-resistance-rated walls, floors, floor/ceiling assemblies, roofs, and roof/ceiling assemblies.
5. Joints between fire-resistance-rated floor or floor/ceiling assemblies and exterior curtain wall assemblies (where a curtain wall is formed by wall materials that bypass the floor slab edge such as aluminum framing and glass, studs and other cladding, or other wall materials).
6. Joints in smoke barriers.
7. Joints at the intersection of horizontal smoke barriers and exterior curtain wall assemblies.
8. Penetrations into or through non-fire-resistance-rated floors, floor/ceiling assemblines, and the ceiling membrane floor/ceiling assemblies.

1.08 PROJECT CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation.

B. Provide ventilation in areas where solvent-cured materials are being installed.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to project site in original unopened containers bearing the name of the manufacturer, product name, type, and testing agency's identification mark.

B. Store products in accordance with manufacturer's instructions.

1.10 SEQUENCING AND SCHEDULING

A. Perform firestopping work after completion of work which penetrates fire barriers, but prior to covering up or eliminating access to the penetration. Coordinate with installers of such other work.

PART 2 PRODUCTS

2.01 SUBSTITUTIONS

A. Refer to Section 01 6000 - Product Requirements.

2.02 MANUFACTURERS

A. Fire Testing of Assemblies: Provide materials and designs that have been tested by approved agencies, as follows:

1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.

B. Provide products complying with requirements of the contract documents and made by a single manufacturer to the greatest extent practicable, unless otherwise indicated and approved by the Architect.

2.03 MATERIALS

A. Firestopping Materials: Provide assemblies whose fire-resistance ratings have been determined by testing in the configurations required and which have fire-resistance ratings at least as high as that of the fire-rated assembly in which they are to be installed.
1. If a tested assembly is not available for a particular penetration or joint configuration, modify the penetration or joint configuration to suit available assemblies; do not modify assembly configuration except as specifically stated in the test report or as approved by the authority having jurisdiction.
2. Provide products that:
a. Allow normal expansion and contraction movement of the assembly without failure of the seal.
b. Emit no hazardous, combustible, or irritating by-products during installation or curing period.
c. Do not require special tools for installation.
3. Provide products that allow for differential movement unless otherwise approved.
4. For products used in horizontal assemblies, provide products that are impervious to water when fully cured.
5. For materials used in expansion joints, provide sealant with at least 40% movement capability in compression or extension. For other joints provide at least 25% movement capability in compression or extension.
6. Select assemblies and products so as to minimize the number of different assemblies and different products used.

B. Partition Labels:
1. Permanent, red lettering with legend "FIRE AND SMOKE BARRIER - PROTECT ALL OPENINGS".
2. Use letters at least 3 inches (77 mm) high.

2.04 ASSEMBLIES

A. Protect fire rated construction and smoke barriers as required by the building code, and using materials subject to the limitations of this specification.
1. Exceptions: Certain materials, locations, and assemblies are exempt where permitted by the building code and approved by the authorities having jurisdiction.

B. Penetrations into or through fire walls, fire barriers, smoke barriers, and fire partitions: Provide through-penetration firestop systems tested per ASTM E 814 or UL 1479, minimum positive pressure differential of 0.01 inch of water, F rating not less than that of the wall.

C. Penetrations into or through fire-resistance-rated floors, floor/ceiling assemblies, and the ceiling membrane of roof/ceiling assemblies: Provide through-penetration firestop systems tested per ASTM E 814 or UL 1479, minimum positive pressure differential of 0.01 inch of water, F rating and T rating not less than that of the floor nor less than 1 hour whichever is greater.

D. Penetrations in smoke barriers: Provide through-penetration firestop systems tested per UL 1479 for air leakage. The L rating measured at 0.30 inch of water in ambient and elevated temperature tests: Not greater than 5.0 CFM/SF of penetration opening for each penetration or a total leakage of 50 CFM for any 100 SF of wall area or floor area.

E. Joints in or between fire-resistance-rated walls, floors and floor/ceiling assemblies: Provide fire-resistant joint systems tested per ASTM E 1966 or UL 2079.

F. Joints in smoke barriers: Provide fire-resistant joint systems tested per UL 2079 for air leakage. The L rating measured at 0.30 inch of water in ambient and elevated temperature tests: Not greater than 5 CFM/LF.

2.05 ACCESSORIES

A. Primers, Sleeves, Forms, and Accessories: Type required for tested assembly design.

PART 3 EXECUTION

3.01 EXAMINATION

A. Preinstallation Inspection:
   1. Inspect for penetrations of any type; mark or otherwise identify all penetrations indicating action required: "Repair" or "Firestop".
   2. Conduct inspection prior to covering up or enclosing walls or ceilings.
   3. Submit a report detailing findings of inspection to the Architect.

B. Include existing penetrations uncovered during the course of construction in the preinstallation inspection.

C. If the configuration of a particular penetration does not conform to the configuration necessary for the required firestopping assembly, modify the construction to suit the firestopping assembly design.

3.02 PREPARATION

A. Prepare penetrations in accordance with material manufacturer's instructions.

B. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.

C. Remove incompatible materials which may affect bond.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings. Provide all accessory materials required.

B. Produce a smooth, uniform, neat appearing finish.

C. Remove combustible forming materials, unless they are a required component of the tested assembly.

D. Do not cover installed firestopping until inspected by authority having jurisdiction, unless such inspection is waived by the authority.

3.04 PERMANENT IDENTIFICATION

A. Affix penetration assembly labels to each fire-stop penetration assembly.

B. Install partition labels on fire rated partitions above lay-in ceilings at intervals not exceeding 12 feet.

3.05 FIELD QUALITY CONTROL

A. Inspect completed installations for completeness and correct installation.

1. Arrange for the firestopping material manufacturer's representative to conduct an inspection of completed work.
2. If installed work is to be covered in completed work, inspect and obtain approval prior to covering.

B. Submit report of inspection to the Architect.

C. Notify the Architect of completed firestopping work prior to covering with subsequent work.

3.06 CLEANING AND PROTECTION

A. Clean adjacent surfaces of excess firestopping materials promptly. Use methods and materials approved by the manufacturers of the penetration seals and of surfaces to be cleaned.

B. Protect adjacent surfaces from damage by material installation.

C. Protect installed work during curing period.

D. Protect installed work from damage from construction operations using substantial barriers, if necessary.

E. Repair damaged firestopping and adjacent materials in accordance with manufacturer's instructions.

END OF SECTION

SECTION 07 9000 - JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Section Includes:
   1. Sealants and joint backing.

B. Work of this section includes:
   1. Sealing of joints indicated in the schedule at the end of this section and in other locations required by the Contract Document.
   2. Seal joints on the interior of the building to prevent the passage of water or air from space to space or between adjacent building materials and assemblies.
   3. Joints of a nature similar to that of joints indicated shall be sealed with same sealer, whether or not specifically indicated on the drawings and schedules to be sealed.

C. Section Does Not Include:
   1. Sealing of gypsum panel/metal stud construction: Section 09 2116 - Gypsum Board Assemblies.
   2. Acoustical Sealant: Section 09 2116 - Gypsum Board Assemblies.
   3. Firestopping: Section 07 8400 - Firestopping.

1.02 REFERENCES

A. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2005.

B. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2005a.

C. FDA 21 CFR 177.2600 - Substances for Use as Basic Components of Single and Repeated Use Food Contact Surfaces; Rubber.

1.03 DEFINITIONS

A. M Type Substrates: Cast-in-place concrete, concrete masonry units, clay brick, masonry mortar, natural stone.

B. G Type Substrates: Glass and transparent plastic glazing sheets.

C. A Type Substrates: Metals, porcelain, glazed tile, and smooth plastics.

D. O Type Substrates: Wood, unglazed tile; substrates not included under other categories.

E. Use T: Surfaces bearing pedestrian or vehicular traffic.

F. Use NT: Non-traffic-bearing surfaces.

1.04 SUBMITTALS

A. Product Data:
   1. Provide manufacturer's data on each joint sealer indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, color availability, and installation instructions.
   2. Provide manufacturer's technical guide containing recommendations for primers for each exterior sealant/substrate combination.

B. Samples: Submit two cured samples for each product exposed to view, illustrating full range of sealant colors available for selection.

C. Installer's Preconstruction Inspection Report: List all conditions detrimental to performance of joint sealer work.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original containers or bundles with labels showing manufacturer, product name or designation, color, shelf life, and installation instructions.

1.06 PROJECT SITE CONDITIONS

A. Environmental Limitations: Do not install sealers if any of the following conditions exist:
   1. Air or substrate temperature exceeds the range recommended by sealer manufacturer or is below 40 degrees F (4.4 degrees C) or is above 100 degrees F (38 degrees C).
   2. Substrate is wet or damp.
   3. Substrate is dusty, oily, or otherwise contaminated.

B. Dimensional Limitations: Do not install sealers if joint dimensions are less than or greater than that recommended by sealer manufacturer; notify the Architect and get joint sealer manufacturer's recommendations for alternative procedures.

C. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

PART 2 PRODUCTS

2.01 SUBSTITUTIONS

A. Refer to Section 01 6000 - Product Requirements.

2.02 SEALANTS

A. Mildew-Resistant Silicone Sealant: One-part, ASTM C 920, Type S, Grade NS, Class 25, Use NT, formulated with fungicide, for interior use on nonporous substrates.
   1. Products:
      a. Dow Chemical Company; Dowsil 786: www.dowcorning.com. (36 g/l)
      b. Momentive GE Silicones: SCS1700 Sanitary; www.siliconesforbuilding.com. (20 g/l)
      c. Pecora Corporation; 860: www.pecora.com. (12 g/l)

B. Silicone Sealant FDA Approved For Food Contact:
   1. Products: One-component acetoxy sealant.
      a. One-part, ASTM C 920, Type S, Grade NS, Class 25, Use NT, G, A, and O.
      b. Comply with the requirements of FDA 21 CFR 177.2600.
      c. Dow Chemical Company; Dowsil 999-A: www.dowcorning.com. (36 g/l)
      d. Pecora Corporation; 860: www.pecora.com. (12/g/l)

C. One-Part Nonsag Urethane Sealant: ASTM C 920, Type S, Grade NS, Class 25, Use NT.
   1. Products:
      a. Master Builders / BASF ; MasterSeal NP 1: www.master-builders-solutions.basf.com. (35 g/l)
      b. Pecora Corporation; Dynatrol I-XL: www.pecora.com. (68 g/l)
      c. Sika Corporation; Sikaflex 1a: www.sika.com. (47.6 g/l)

2.03 ACCESSORIES

A. Primer for Silicone Sealants: Nonstaining type, as recommended by joint sealant manufacturer for specific substrates encountered on the project and as verified by testing.

B. Joint Cleaner: Noncorrosive and nonstaining type, recommended by sealant manufacturer; not damaging to substrates, and compatible with joint forming materials.

C. Backer Rods: Flexible, nonabsorbent, compressible polyethylene foam, either open cell or nongassing closed cell, unless otherwise restricted by sealant manufacturer; preformed to appropriate size and shape.

D. Bond-Breaker Tape: Self-adhesive, polyethylene or other plastic tape, unless otherwise restricted by sealant manufacturer; suitable for preventing sealant adhesion.

E. Masking Tape: Nonabsorbent, nonstaining.

F. Tooling Agents: Approved by sealant manufacturer; nonstaining to sealant and substrate.

2.04 SEALANT COLORS

A. The Architect will select sealant colors from manufacturer's full range of available colors for each respective sealant and adjacent substrate.

B. Obtain approval of mock-up color before ordering job quantities of sealant.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine joints for characteristics that may affect sealer performance, including configuration and dimensions.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Cleaning: Just before starting sealer installation, clean out joints as follows:
   1. Remove loose materials and foreign matter which might impair adhesion of sealant including, but not limited to, dust, dirt, coatings, paint, oil, and grease.
   2. Dry out damp and wet substrates thoroughly.
   3. Clean A-type and G-type substrates by chemical or other methods that will not damage the substrate.
   4. Remove loose particles by brushing and by blowing with oil-free compressed air.
   5. Concrete: Remove laitance and form-release coatings.
   6. Use methods which will not leave residues that will impair adhesion.

B. Prime joint substrates where required by this specification, manufacturer's recommendations, or adhesion tests.

C. Masking Tape: Use masking tape to keep primers and sealers off of adjacent surfaces which would be damaged by contact or by cleanup. Remove tape at the end of each day.

D. Protect elements surrounding the work of this section from damage or disfigurement.

E. Install fillers where needed to provide proper joint depth or support for sealant backers.

F. Do not begin joint sealer work until unsatisfactory conditions have been corrected.

3.03 INSTALLATION

A. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

B. Comply with sealer manufacturer's installation instructions and recommendations, except where more restrictive requirements are specified.

C. Gunnable and Pourable Sealants: Comply with recommendations of ASTM C 1193.

D. Backers:
   1. Install backers at depth required to result in shape and depth of installed sealant which allows the most joint movement without failure.
      a. Make backers continuous, without gaps, tears, or punctures.

b. Do not stretch or twist backers.

2. Use bond-breaker tape wherever it is necessary to keep sealant from adhering to back or third side of joint.
3. If backers become wet or damp before installation of sealant, dry out thoroughly before proceeding.

E. Shape and Depth: Use methods recommended by manufacturer; completely fill the joint; make full contact with bond surfaces; tool nonsag sealants to smooth surface eliminating air pockets.
1. Use concave joint shape shown in Figure 8 in ASTM C 1193, where not otherwise indicated.
2. Depth of sealant at center of joint, unless otherwise required by the Contract Documents or recommended by manufacturer:
a. For joints up to 1/4 inch (6.4 mm) wide: Depth equal to width.
b. For joints 1/4 inch to 1/2 inch (13 mm) wide: Depth equal to 1/4 inch.
c. For joints over 1/2 inch (13 mm) wide: Depth equal to 1/2 the width but not deeper than 1/2 inch.
3. Contact depth: Twice the depth of sealant at center of joint, unless otherwise required.

3.04 CLEANING

A. Clean adjacent soiled surfaces adjacent to joints as work progresses and before sealants set using methods and materials approved by manufacturers of sealers and of surfaces to be cleaned.

3.05 PROTECTION OF FINISHED WORK

A. Protect sealants from contamination and damage until cured.

B. Remove and replace damaged sealers.

3.06 SCHEDULE

A. General:
1. Seal joints on the interior of the building to prevent the passage of water or air from space to space or between adjacent building materials and assemblies.
2. Joints of a nature similar to that of joints indicated shall be sealed with same sealer, whether specifically indicated on the drawings and schedules to be sealed or not.

B. Typical Interior Joints:
1. Including, but not limited to:
a. Between walls or partitions and adjacent casework, fixed equipment, lighting fixtures.
b. Between concrete or masonry or other material and the perimeters of frames of doors, windows, access panels, etc. (Note: Sealing of gypsum panel/metal stud construction is specified in Section 09 2116.)
c. Between hollow metal jambs and resilient flooring.
d. Around penetrations such as electrical boxes, plumbing, cabinets, ducts, and other openings in concrete or masonry walls or partitions. Comply with recommendations and details in USG Corporation's "Gypsum Construction Handbook".
e. Interior joints for which no other sealer is indicated.
2. Use the following sealant:
a. One part, nonsag urethane sealant.

C. Joints in Interior Wet Areas:
1. Including, but not limited to:
a. Kitchens.

b. Between walls or other surfaces and adjacent plumbing fixtures, fittings, and casework.

2. Use the following sealants:
   a. Mildew-resistant silicone sealant.
   b. For food contact surfaces: Silicone FDA approved for food contact.

END OF SECTION

SECTION 08 1100 - STEEL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Work Included in this Section:
   1. Steel Frames:
      a. Non-fire-resistance rated interior steel frames.
      b. Fire-resistance rated interior steel frames.
      c. Steel frames in gypsum board partitions.

1.02 REFERENCES

A. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 2003.

B. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2004).

C. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware; Door and Hardware Institute; current edition (ANSI/DHI A115 Series).

1.03 SUBMITTALS

A. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.

B. Shop Drawings: Details of each opening showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

1.04 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 SUBSTITUTIONS

A. Refer to Section 01600 - Product Requirements.

2.02 MANUFACTURERS

A. Steel Doors and Frames:
   1. Ceco Door Products: www.cecodoor.com.
   2. Republic Builders Products: www.republicdoor.com.
   3. Steelcraft: www.steelcraft.com.

2.03 GENERAL

A. Hardware Preparation: In accordance with DHI A115 Series, with reinforcement welded in place, in addition to other requirements specified in door grade standard.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.04 STEEL FRAMES

A. General:
   1. Comply with the requirements of grade specified for corresponding door, except:
      a. ANSI A250.8 Level 1 Doors: 16 gage frames.
   2. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 16 gage
   3. Finish: Factory primed, for field finishing.
   4. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

B. Interior Door Frames, Non-Fire-Rated:
   1. Gypsum board partitions. Fully welded.

C. Interior Door Frames, Fire-Rated:
   1. Gypsum board partitions. Fully welded.
   2. Fire Rating: Same as door, labeled.

2.05 ACCESSORY MATERIALS

A. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

B. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.06 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.02 INSTALLATION

A. Install in accordance with the requirements of the specified door grade standard.

B. Coordinate frame anchor placement with wall construction.

C. Coordinate installation of hardware.

3.03 ERECTION TOLERANCES

A. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.04 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.05 SCHEDULE - SEE DRAWINGS

END OF SECTION

SECTION 08 1416 - FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Solid core veneer-faced doors with a transparent finish.
   2. Fire-resistance rated doors.
   3. Factory finishing.
   4. Glazing stops and preparation of flush doors to receive glazing; glazing specified elsewhere.
   5. Prefitting by manufacturer.
   6. Premachining by manufacturer.

1.02 REFERENCES

A. Architectural Woodwork Standards; Architectural Woodwork Institute (AWI); 2009, Edition 1.

B. NFPA 80 -- Standard for Fire Doors and Windows; National Fire Protection Association; 2007.

C. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies ; 2012.

D. WDMA (HOW)-- How to Store, Handle, Finish, Install, and Maintain Wood Doors; Wood Flush Doors; National Wood Window and Door Association; 2004.

E. WDMA I.S. 1A -- Industry Standard for Interior Architectural Wood Flush Doors; Window and Door Manufacturers Association; 2013.

F. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.03 SUBMITTALS

A. Product Data: Submit detailed technical information for each distinct product specified in this section. Include complete data for factory finished doors.

B. Shop Drawings: Prepare and submit shop drawings showing relevant information, including:
   1. Construction details for each distinct product type.
   2. Dimensions and location of blocking for hardware.
   3. Fire ratings.
   4. Factory finishing details.

C. Samples: Submit samples for the following:
   1. Veneer verification samples: Minimum 8-1/2 by 11 inches.
   2. Factory finishes:
      a. Verification samples: Minimum 8-inch-square sample for each color, effect, and type of factory finish.
   3. Glazing assemblies: For each type and finish, provide minimum 12-inch-long sample.

D. Certificates:
   1. Submit certification that manufacturer's construction standards and tested fire door assembly requirements comply with contract requirements indicated for doors, hardware, hardware templating, size of lights, and other design characteristics.
      a. Clearly note any exceptions to certification, citing door number and hardware set. Exceptions shall be subject to the approval of the Architect.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products as required to prevent damage or deterioration. Conform to manufacturer's recommendations, requirements of referenced standard, and recommendations

of WDMA I.S.1A, Appendix, "How to Store, Handle, Finish, Install, and Maintain Wood Doors."

B. Clearly label each door with opening number where door will be installed. Use removable, temporary labels or mark on door surface which will be concealed from view after installation.
   1. Coordinate door identification with shop drawing designations.

C. Environmental Requirements: Do not deliver, store, or install products of this section before building's design temperature and humidity levels have been achieved and will be maintained at those levels.

1.05 WARRANTIES

A. Manufacturer's Warranty (Interior Doors):
   1. Submit a written warranty signed by the manufacturer guaranteeing to correct failures in products which occur within the warranty period indicated below, without reducing or otherwise limiting any other rights to correction which the Owner may have under the contract documents. Failures are defined to include:
      a. Faulty workmanship.
      b. Delamination.
      c. Stile, rail, or core show-through (telegraphing) visible to the naked eye to any degree when viewed from a horizontal distance of 3 to 4 feet.
      d. Warp (including bow, cup, and twist) in excess of 1/4 inch when measured in accordance with WDMA I.S. 1A.
   2. Correction includes repair or replacement at the option of the Architect. Correct failures which occur within the following warranty periods after Substantial Completion:
      a. Solid core interior doors: Life of original installation.

B. If, for any reason, the Contractor's work results in nullification of manufacturer's warranty, the Contractor shall correct failures and pay for such correction.

PART 2 PRODUCTS

2.01 SUBSTITUTIONS

A. Refer to Section 01 6000 - Product Requirements.

2.02 WOOD DOORS - GENERAL REQUIREMENTS

A. Flush Doors: Conform to one of the following:
   1. WDMA I.S. 1-A: "Industry Standard for Interior Architectural Wood Flush Doors".
   2. AWI "Architectural Woodwork Standards".

B. Door Performance Grade: Heavy Duty.

C. Fire-Rated Doors:
   1. Provide doors that comply with NFPA 80 and that are precise duplicates of doors tested as part of fire-rated assemblies in accordance with requirements of NFPA 252. Seals shall not be visible when door is open. Do not employ frame-applied seals.
   2. Acceptable testing and inspection agencies:
      a. Underwriters Laboratories Inc.
      b. Warnock Hersey International Inc.
   3. Construction: Conform to testing agency requirements for indicated fire rating.
      a. Ratings of 45 minutes or more: Mineral core.
      b. Ratings of 20 minutes: Particleboard core.

c. Temperature rise rating: For fire-rated doors in stairwell enclosures, provide door construction tested and certified to limit temperature rise in thirty minutes to 450 degrees, F.

4. Edges: Laminated edge (stile) designed for use with mortise hinges and appropriate for indicated fire resistance rating.
5. Rails and blocking: Laminated material designed for use as blocking or rails and appropriate for indicated fire resistance rating. Provide the following for fire rated doors with 45-minute or greater rating:
   a. All doors: Provide 5-inch-wide top and bottom rails; provide lock blocking.
   b. Doors with exit devices: Provide lock blocking both sides or continuous intermediate rail.
   c. Doors with flush or surface bolts: Provide blocking for bolts.
   d. Doors, transoms, or side panels with strikes: Provide blocking for strikes.
6. Acceptable products for edges, rails, and blocking:
   a. "Firestop I" for blocking and rails, "Firestop II" for stiles; Georgia-Pacific.
   b. "SLM" for blocking and rails, "SLM II" for stiles; Timberland Components.
   c. "Triple-Ply"; Weyerhauser.
   d. Other products acceptable to manufacturer, subject to the approval of the Architect.
7. Through-bolted hardware: Blocking specified in this section shall not relieve the requirement for through-bolted closers, exit devices, and similar hardware. Through-bolted closers, exit devices, and similar hardware specified shall not relieve the requirement for solid blocking. Provide through-bolted hardware and solid blocking.
8. Pairs of fire rated doors: Where required to meet fire rating, provide metal meeting edges at pairs of vertical rod exit devices, and astragals and metal edges elsewhere.
   a. At veneered doors with transparent finish, cover metal with matching veneer.
   b. At opaque field finished doors, provide metal primed for painting.
   c. At doors with opaque factory finish (paint or HPDL), apply baked enamel factory finish to metal to match door finish.
9. Testing laboratory labels: Permanently affixed to hinge stile.
   a. Construction labeling is not an acceptable to standard labeling unless requested in accordance with the substitution procedures specified in Division 1 and approved in writing by the Architect.

2.03 CONSTRUCTION

A. Appearance Grade: Premium.

B. Faces:
   1. Veneer species, cut, and grade for transparent finish (HPVA standards):
      a. HVPA Grade AA.
      b. Red Oak, Plain Sliced.
   2. Veneer matching for transparent finish:
      a. Between adjacent veneer leaves: Book Match.
      b. Within panel face: Running match.

C. Construction: PC-5 (5-ply).

D. Core, Non-Fire-Rated Doors: Particleboard, bonded to stiles and rails, sanded.

E. Core, Fire Rated Doors: As specified above.

F. Core, Glass Light Doors: Where stile width is less than 10 inches, or where glass height is over 1/2 of the height of the door, or where other required features do not qualify for

manufacturer's standard construction, provide specially reinforced core construction utilizing laminated strand lumber or other materials approved by the Architect.

G. Door Thickness: 1-3/4" unless indicated otherwise.

H. Glue: Type I.

2.04 ACCESSORIES

A. Stops for Glazing: Provide flush style glazing stops.
   1. For non-fire-rated doors: Solid stock of species to match door face veneer; finish to match door.
   2. For fire rated doors 45 minutes and over: Cold-rolled sheet steel of gage approved by testing agency for installation in fire-rated doors indicated. Cover exposed surfaces of glazing stops with wood veneer to match door faces. Finish veneer to match door.
   3. For 20 minute fire-rated doors: Solid stock fire-retardant treated wood of species to match door face veneer; finish to match door.

2.05 FABRICATION

A. General:
   1. Fabricate to provide consistent clearances as indicated.
   2. Hinge and lock edges:
      a. Provide 1/8-inch standard bevel at edges, unless standard bevel would not precisely match hardware bevel; provide proper bevel for hardware.
      b. Predrill pilot holes for hinges on fire doors with laminated hinge stiles.
   3. Make neat mortises and cutouts for door hardware indicated.
   4. Prefitting: Fabricate and trim doors to size at factory to coordinate with frame shop drawings and floor finishes as indicated in the finish schedule.
      a. Provide non-standard clearances and tolerances indicated in Part 3.
   5. Premachining: Make all mortises and cutouts required for hardware at the factory to conform to approved hardware schedule, hardware templates, and door frame shop drawings.

B. Openings: Cut, trim, and seal openings in doors at the factory.

2.06 FACTORY FINISHING

A. Comply with one of the following:
   1. AWI Section 5, "Factory Finishing".
   2. WDMA "Finishing".

B. Transparent Finish:
   1. WDMA System TR-6 Catalyzed Polyurethane or TR-8 UV Cured Acrylated Polyester/Urethane.
   2. AWI System 11 Catalyzed Polyurethane or System 9 UV Cured Acyrlated Polyester/Urethane.
   3. Sheen: Satin.
   4. Staining: Match the Architect's sample.
   5. Grade: Premium.
   6. Tops and bottoms of doors to be finished also.

PART 3 EXECUTION

3.01 EXAMINATION

A. Inspect door frames and doors before beginning door installation.

1. Verify that frames are properly installed and aligned and are capable of providing trouble free support for doors throughout range of door swing.

B. Correct unsatisfactory conditions before installing products of this section. Commencement of installation indicates acceptance of conditions.

3.02 INSTALLATION

A. Hardware Installation: Elsewhere in Division 8.

B. Install doors in accordance with manufacturer's recommended procedures and requirements of referenced standard.
   1. Fire-rated doors: Comply with NFPA 80 requirements.

C. Prefit Doors: Minimize field fitting to those procedures which are necessary to complete work unfinished during factory prefitting and to provide trouble free operation.
   1. Accurately align and fit doors for trouble free operation throughout range of door swing.

D. Prefitting Clearances:
   1. Door edge and head: 1/8 inch.
   2. Door edge and jamb: 1/8 inch.
   3. Door bottom edge and top surface of threshold: 1/4 inch.
   4. Door bottom edge and floor covering surface or finish (where threshold is not indicated): 1/8 inch.
   5. Meeting edges at pairs of doors: 1/8 inch total.

E. Installation Clearances: Install doors so as to maintain prefitting clearances specified.

F. Factory-Finished Doors: Before installing doors, restore finish at door edges cut during field fitting.

3.03 ADJUSTING

A. Adjust doors for proper operation; coordinate with hardware adjustment; replace doors that cannot be properly adjusted.

B. Where door finishes are damaged during installation, restore in a manner that results in the door showing no evidence of the restoration. If refinished door cannot be made to match other doors, remove refinished door and replace with new conforming work at the Contractor's expense.

C. Protect installed work.

END OF SECTION

SECTION 08 7100 - DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for wood doors.

1.02 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. BHMA A156.1 - American National Standard for Butts and Hinges; 2013.

C. BHMA A156.3 - American National Standard for Exit Devices; 2014.

D. BHMA A156.4 - American National Standard for Door Controls - Closers; 2013.

E. BHMA A156.5 - American National Standard for Cylinders and Input Devices for Locks; 2014.

F. BHMA A156.6 - American National Standard for Architectural Door Trim; 2010.

G. BHMA A156.7 - American National Standard for Template Hinge Dimensions; 2014.

H. BHMA A156.13 - American National Standard for Mortise Locks & Latches Series 1000; 2012.

I. BHMA A156.18 - American National Standard for Materials and Finishes; 2012.

J. BHMA A156.21 - American National Standard for Thresholds; 2014.

K. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.

B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

C. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

1.04 SUBMITTALS

A. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.

B. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.

1. Provide complete description for each door listed.

C. Shop Drawings - Electrified Door Hardware: Submit diagrams for power, signal, and control wiring for electrified door hardware that include details of interface with building safety and security systems. Provide elevations and diagrams for each electrified door opening as follows:

1. Elevations: Submit front and back elevations of each door opening showing electrified devices with connections installed and an operations narrative describing how opening operates from either side at any given time.
2. Diagrams: Submit point-to-point wiring diagram that shows each device in door opening system with related colored wire connections to each device.

D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

E. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

F. Manufacturer's Qualification Statement.

G. Installer's Qualification Statement.

H. Supplier's Qualification Statement.

I. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

J. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

1.05 QUALITY ASSURANCE

A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Architect and Contractor.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion.
   1. Closers: Five years, minimum.
   2. Locksets and Cylinders: Three years, minimum.
   3. Other Hardware: Two years, minimum.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

B. Provide individual items of single type, of same model, and by same manufacturer.

C. Provide door hardware products that comply with the following requirements:
   1. Applicable provisions of federal, state, and local codes.

2.02 HINGES

A. Acceptable Manufacturers:
   1. McKinney; an Assa Abloy Group company: www.assaabloydss.com.
   2. Hager Companies; www.hagerco.com
   3. Stanley, dormakaba Group; www.stanleyhardwarefordoors.com/#sle

B. Hinges: Complying with BHMA A156.1, Grade 1.
   1. Butt Hinges: Complying with BHMA A156.1 and BHMA A156.7 for templated hinges.
      a. Provide hinge width required to clear surrounding trim.

2. Provide hinges on every swinging door.
3. Provide ball-bearing hinges at each door with closer.
4. Provide following quantity of butt hinges for each door:
   a. Doors From 60 inches High up to 90 inches High: Three hinges.

2.03 EXIT DEVICES

A. Manufacturers:
   1. Von Duprin, an Allegion brand; CD98/98 Series: www.allegion.com/us.

B. Exit Devices: Complying with BHMA A156.3, Grade 1.
   1. Lever design to match lockset trim.
   2. Provide cylinder with cylinder dogging or locking trim.
   3. Provide exit devices properly sized for door width and height.
   4. Provide strike as recommended by manufacturer for application indicated.
   5. Provide UL (DIR) listed exit device assemblies for fire-rated doors and panic device assemblies for non-fire-rated doors.

2.04 LOCK CYLINDERS

A. Manufacturers:
   1. Basis of Design: Best.
   2. No substitutions allowed.

B. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
   1. Provide standard, conventional, and small format interchangeable core (SFIC) type cylinders, Grade 1, with six-pin core in compliance with BHMA A156.5 at locations indicated.

2.05 MORTISE LOCKS

A. Manufacturers:
   1. Best, dormakaba Group; 40H Series x 14H: www.bestaccess.com/#sle.
   2. Schlage, an Allegion brand; 7L Series x 07B: www.allegion.com/us.

B. Mortise Locks: Complying with BHMA A156.13, Grade 1, Security, 1000 Series.
   1. Latchbolt Throw: 3/4 inch, minimum.
   2. Deadbolt Throw: 1 inch, minimum.
   3. Backset: 2-3/4 inch unless otherwise indicated.
   4. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.
      a. Finish: To match lock or latch.

2.06 DOOR PULLS AND PUSH PLATES

A. Door Pulls and Push Plates: Complying with BHMA A156.6.
   1. Pull Type: Straight, unless otherwise indicated.
   2. Push Plate Type: Flat, with square corners, unless otherwise indicated.
      a. Edges: Beveled, unless otherwise indicated.
   3. Material: Aluminum, unless otherwise indicated.

2.07 CLOSERS

A. Manufacturers; Surface Mounted:
   1. LCN, an Allegion brand; 4000 Series: www.allegion.com/us.

B. Closers: Complying with BHMA A156.4, Grade 1.
   1. Type: Surface mounted to door. Concealed closers and floor closers are not acceptable.
   2. Provide door closer on each fire-rated and smoke-rated door.

3. At corridor entry doors, mount closer on room side of door.
4. Closers must be through-bolted on metal and wood doors.

2.08 KICK PLATES

A. Kick Plates: Provide along bottom edge of push side of every door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.
1. Size: 8 inch high by 2 inch less door width (LDW) on push side of door.

2.09 SILENCERS

A. Silencers: Provide at equal locations on door frame to mute sound of door's impact upon closing.
1. Single Door: Provide three on strike jamb of frame.
2. Pair of Doors: Provide two on head of frame, one for each door at latch side.
3. Material: Rubber, gray color.

2.10 FINISHES

A. Finishes: Provide door hardware of same finish, unless otherwise indicated.
1. Primary Finish: 630; satin stainless steel, with stainless steel 3000 series base material (former US equivalent US32D); BHMA A156.18.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

B. Verify that electric power is available to power operated devices and of correct characteristics.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item.
1. Mounting heights in compliance with ADA Standards:

3.03 ADJUSTING

A. Adjust work under provisions of Section 01 7000 - Execution and Closeout Requirements.

B. Adjust hardware for smooth operation.

C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.04 CLEANING

A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.

B. Clean adjacent surfaces soiled by hardware installation.

3.05 PROTECTION

A. Protect finished Work under provisions of Section 01 7000 - Execution and Closeout Requirements.

B. Do not permit adjacent work to damage hardware or finish.

3.06 HARDWARE SCHEDULE

HW SET: 1 - CLASSROOMS

DOOR NUMBER:
202A 202B 216A 216B

EACH TO HAVE:

3	EA	HINGE	FBB179 4.5 X 4.5	STANLEY
1	EA	CLASSROOM LOCK	L9070L	SCH
1	EA	MORTISE CYLINDER	1E74 CORMAX	BES
1	EA	SURFACE CLOSER	4011	LCN
1	EA	WALL STOP	WS407CCV	IVE
3	EA	SILENCER	1608	

HW SET: 2 – EVENT SPACE

DOOR NUMBER:
233

EACH TO HAVE:

6	EA	HINGE	FBB179 4.5 X 4.5	STANLEY
1	EA	ELECTRICAL HW HINGE	FBB179 4.5 X 4.5 1104	STANLEY
1	EA	ELECTRIC LOCK	L9092LEU RX DPS	SCH
1	EA	MORTISE CYLINDER	1E74 CORMAX	BES
2	EA	SURFACE CLOSER	4011	LCN
1	EA	WALL STOP	WS407CCV	IVE
1	EA	FLOOR STOP	FS13	IVE
2	EA	KICK PLATE	8400	IVE
3	EA	SILENCER	1608	
1	EA	CARD READER	BY SECURITY	

COORDINATE WITH SECURITY AND ELECTRICAL SYSTEMS

PRESENTATION OF VALID READER SHUNTS DOOR POSITION SWITCH AND UNLOCKS LEVER TRIM FOR AUTHORIZED ENTRY. RX SWITCH IN INSIDE LEVER SHUNTS DOOR POSITION SWITCH ON EXIT. FREE EGRESS AT ALL TIMES.

END OF SECTION

SECTION 08 8000 - GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Clear Float Glass.

B. Clear Tempered Glass.

C. Fire Rated Glass.

1.02 REFERENCES

A. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2004.

B. ASTM C 1036 - Standard Specification for Flat Glass; 2006.

C. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass; 2004.

D. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 2004.

E. GANA (SM) - FGMA Sealant Manual; Glass Association of North America; 1990.

1.03 SUBMITTALS

A. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

PART 2 PRODUCTS

2.01 SUBSTITUTIONS

A. Refer to Section 01 6000 - Product Requirements.

2.02 MANUFACTURERS

A. Clear and Tinted Float Glass:
   1. AFG Industries, Inc: www.afgglass.com.
   2. Guardian Industries Corp: www.guardian.com.
   3. Pilkington Building Products North America: www.pilkington.com.
   4. Vitro: www.vitroglazings.com.

B. Fire Rated Glass; Laminated Ceramic Glazing Material:
   1. Nippon Electric Glass Co., Ltd. and distributed by Technical Glass Products.

2.03 FLAT GLASS MATERIALS

A. Clear Float Glass (08 8000.CF): Clear, annealed.
   1. Comply with ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
   2. Comply with ASTM C 1048. Provide Type HS (heat strenthened) glass except where Type FT (fully tempered) is required.

B. Tempered Safety Glass (08 8000.TS): Clear; fully tempered with horizontal tempering.

1. Comply with ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select) and ASTM C 1048.
2. Comply with ANSI Z97.1.

2.04 FIRE RATED GLAZING PRODUCTS

A. Fire Rated Glass: (08 8000.F): Monolithic Ceramic Glazing Material.
   1. Fire Rating: 20 minutes to 90 minutes.
   2. Thickness: 3/16 inch (5mm) overall.
   3. Products:
      a. FireLite Premium by Nippon Electric Glass Co., distributed by Technical Glass Products.
      b. Pyran Platinum; Schott North America, Inc.
      c. SGG Keralite Select, by Vetrotech Saint Gobain North America.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

3.02 INSTALLATION

A. Install glazing in accordance with GANA Glazing Manual and system manufacturer's instructions.

3.03 INSTALLATION – FIRE RATED GLAZING

A. Glaze vertically into labeled fire-rated metal frames or partition walls with same fire rating as glass and push against tape for full contact at perimeter of pane or unit.

B. Place glazing tape of free perimeter of glazing in same manner described above.

C. Do not remove protective edge tape.

3.04 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

END OF SECTION

SECTION 09 0561 - PREPARATION OF CONCRETE TO RECEIVE ADHESIVELY INSTALLED FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal of existing floor coverings.

B. Testing of concrete floors that will receive adhesively applied floor covering.

C. Testing of existing concrete floor slabs for moisture.

D. Testing of floor slabs for adhesive bond.

E. Preparation of concrete floor slabs for installation of floor coverings.

F. Remediation of concrete floor slabs where testing indicates unsatisfactory moisture or pH conditions or unsatisfactory adhesive bond.
   1. Contractor shall perform all specified remediation of concrete floor slabs.

1.02 PRICE AND PAYMENT PROCEDURES

A. Moisture and pH testing shall be performed by an independent testing agency employed and paid by Contractor.

B. Include the cost of moisture and pH testing in the base bid.

C. Include the cost of standard adhesive in the base bid.

D. Unit Prices: See Section 01 2200 - Unit Prices.

E. Unit Price for Standard Flooring Adhesive: State on the bid form the unit price per square foot for using the floor covering manufacturer's standard adhesive.
   1. Provide a unit price for each distinct type of floor covering.

F. Unit Price for Moisture-Resistant Flooring Adhesive: State on the bid form the unit price per square foot for using the moisture-resistant flooring adhesive.
   1. Provide a unit price for each distinct type of floor covering.

G. Unit Price for Moisture-Resistant Sealer-Surfacer: State on the bid form the unit price per square foot for the moisture-resistant sealer-surfacer.
   1. Provide a unit price for each distinct type of floor covering.

1.03 REFERENCES

A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2012.

B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete; 1999 (Reapproved 2009).

C. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2011.

D. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; Resilient Floor Covering Institute; October 2011.

1.04 SUBMITTALS

A. Visual Observation Report: For existing floor coverings to be removed.

B. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
   1. Moisture and pH limits and test methods.

2. Manufacturer's required bond/compatibility test procedure.

C. Testing Agency's Report: Include:
1. Description of areas tested; include floor plans and photographs if helpful.
2. Summary of conditions encountered.
3. Moisture and pH test reports in the format required by referenced test method.
4. Copies of specified test methods.

D. Adhesive Bond and Compatibility Test Report.

E. Copy of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings.

F. Product Data: Manufacturer's published data on each product specified in Part 2.
1. Manufacturer's installation instructions.

G. Moisture-Resistant Installer Quallifications: Signed by the materials manufacturer.

1.05 QUALITY ASSURANCE

A. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified, and acceptable to the Owner.
1. Submit evidence of experience consisting of at least 3 test reports of the type required, with the respective project owner's project contact information.

B. Contractor's Responsibility Relating to Independent Agency Testing:
1. Provide access for and cooperate with testing agency.
2. Confirm date of start of testing at least 10 days prior to actual start.
3. Allow at least 4 business days on site for testing agency activities.
4. Achieve and maintain specified ambient conditions.
5. Allow ample time for testing activity and remedial measures, if necessary, in the Construction Project Schedule. Notify Owner and Architectwhen specified ambient conditions have been achieved, and coordinate dates of testing with the parties involved.

C. Moisture-resistant sealer-surfacer Installer: Approved by materials manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, handle, and protect products in accordance with manufacturer’s instructions and recommendations.

B. Deliver materials in manufacturer’s packaging; include installation instructions.

C. Keep materials from freezing.

1.07 FIELD CONDITIONS

A. In spaces where concrete testing will be performed, maintain ambient temperature at ancticipated in-service temperature for not less than 48 hours prior to and during testing.

B. In spaces where concrete testing will be performed, maintain relative humidity at anticipated in-service humidity level for not less than 48 hours prior to and during testing.

PART 2 PRODUCTS

2.01 REMEDIATIONS

A. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.

B. Excessive Moisture Emission or Relative Humidity or excessive pH: If an adhesive that is resistant to the level of moisture and pH present is available and acceptable to flooring

manufacturer, use that adhesive for installation of the flooring; if not, apply Moisture-Resistant Sealer-Surfacer over entire floor area.

2.02 MATERIALS

A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
   1. Cementitious compound, resistant to moisture, mildew, and alkali, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
   2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
   3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.

B. Moisture-Resistant Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.

C. Moisture-Resistant Sealer-Surfacer: Multi-coat system comprising epoxy sealer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of pH found, followed by surfacing coat that acts to relieve osmotic vapor pressure and provides a suitable profile for adhesion of floor coverings without further treatment.
   1. Mechanically abrade concrete to achieve ICRI Concrete Surface Profile (CSP) of 3 before applying moisutre-resistant sealer-surfacer.
   2. Products:
      a. ARDEX Engineered Cements; www.ardexamericas.com.
         1) 3-coat system: Ardex MC Rapid, Ardex P 82 Ultra Prime, and either Ardex Feather Finish, Ardex V1200, or Ardex K13 depending on project conditions.
      b. Koster American Corporation; www.kosterusa.com.
         1) 3-coat system: Koster VAP I 2000, Koster I 09 Primer, Koster SL Premium.
      c. Sika Corporation; www.sikafloorusa.com.
         1) 3-coat system: Sika MB, SikaLevel-02 EZ Primer, and either SikaLevel Skim Coat, SikaLevel-125, or SikaLevel-325.
      d. Substitutions: See Section 01 6000 - Product Requirements.

D. Leveler / Resurfacer: Product intended by its manufacturer to restore rough, uneven concrete subrate to a smooth, level surface suitable to receive adhesively applied floor covering.
   1. Products:
      a. ARDEX Engineered Cements : Ardex FeatherFinish; www.ardexamericas.com.
         1) Over concrete: Mechanically abrade concrete to achieve ICRI Concrete Surface Profile (CSP) of 3 before applying leveler / resurfacer.
      b. ARDEX Engineered Cements : Ardex K 55 Microtec; www.ardexamericas.com.
         1) Over concrete: Mechanically abrade concrete to achieve ICRI Concrete Surface Profile (CSP) of 3 before applying leveler / resurfacer.
         2) Over Ardex MC series: Ardex P 82 Ultra Prime.
      c. Koster American Corporation: Koster SL Premium Overlay; www.kosterusa.com.

1) Over concrete: Mechanically abrade concrete to achieve ICRI Concrete Surface Profile (CSP) of 3 followed by Koster SB Bonding Emulsion.
2) Over Koster VAP I 2000: Koster VAP I 06 Primer.

d. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 GENERAL

A. Perform following operations in the order indicated:
1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
b. Removal of existing floor covering.
2. Preliminary cleaning.
3. Testing.
a. Perform the following types of test in close proximity to each other:
b. Internal Relative Humidity Tests; 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer. Ensure that a portion of the tests are adjacent to exterior walls and to expansion and control joints.
c. pH tests; at same frequency as other tests.
4. Specified moisture remediation, if required.
5. Patching, smoothing, and leveling, as required.
6. Other preparation specified.
7. Adhesive bond test performed by flooring installer.
8. Protection.

3.02 EXISTING FLOOR COVERINGS

A. Remove existing floor coverings, adhesives, and underlayments down to bare concrete.

B. Comply with Local, State, and Federal regulations and recommendations of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings, as applicable to floor covering being removed.

C. Dispose of removed materials in accordance with Local, State, and Federal regulations and as specified.

3.03 PRELIMINARY CLEANING

A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.

3.04 INTERNAL RELATIVE HUMIDITY TESTING

A. Test existing concrete floor slabs for relative humidity.

B. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

C. Where this specification conflicts with the referenced test method, comply with the requirements of this section.

D. Test in accordance with ASTM F2170 Procedure A and as follows.

E. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.

F. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.

G. Report: Report the information required by the test method.

3.05 ADHESIVE BOND AND COMPATIBILITY TESTING

A. Test floors for adhesive bond of floor covering to floor slabs that have been prepared in accordance with floor covering manufacturer's recommendations.

B. In the event that bond does not comply with floor covering manufacturer's requirements, perform surface preparation and remediation as recommended by floor covering manufacturer.

3.06 REMEDIATION OF FLOORS TO RECEIVE FLOOR COVERING

A. Comply with requirements and recommendations of product manufacturer.

B. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities as recommended by product manufacturer.

C. Do not fill expansion joints, isolation joints, or other moving joints.

3.07 PROTECTION

A. Cover prepared floors with building paper or other durable covering.

END OF SECTION

SECTION 09 0610 - PARTITION SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Partitions faced with gypsum panels, and including facings of:
   1. Gypsum wallboard.

1.02 DEFINITIONS

A. Partitions: Every partition dividing two spaces is a noise, air, and dust control partition.

PART 2 PRODUCTS

2.01 GYPSUM PANEL FACINGS

A. Provide types of gypsum panels in locations listed below.

B. General use, and where not otherwise indicated:
   1. Provide gypsum wallboard.

2.02 PRODUCTS

A. Provide products specified elsewhere in Division 9.

PART 3 EXECUTION

3.01 GENERAL

A. Construct partitions in accordance with requirements specified elsewhere in Division 9.

B. Seal smoke, noise, air, and dust partitions in accordance with requirements specified in Gypsum Board Assemblies section and Joint Sealers section.

3.02 PARTITION LEGEND

A. On the drawings, partition types are indicated using tags composed generally as follows (see individual descriptions in partition schedule below for specific requirements).

B. First Position: Fire rating.
   1. Zero, 1, 2, 3, or 4 hours.

C. Second Position: Construction Material. Extend all partitions and materials from floor to overhead solid structure unless otherwise indicated.
   1. A Metal studs and gypsum panels from floor to 6" above ceiling.
   2. SA Metal studs to structure, gypsum panels from floor to 6" above ceiling.
   3. S Metal studs and gypsum panels.
   4. U Steel studs and gypsum board from floor to underside of ceiling.

D. Third Position: Indicates construction features as described under individual descriptions in partition schedule below.

E. Fourth Position:
   1. G Gypsum panels (wallboard, tile backer, veneer base, etc.); type of panel as specified above under "gypsum panel facings".

F. Final Position, outside of box on drawings:
   1. Dimension of stud or masonry measured to outside face. Dimensions of stud are actual. Dimensions of masonry are actual unless indicated otherwise.
   2. Where no stud dimension is indicated adjacent to box, provide 3-5/8-inch studs.
   3. Where no dimension is indicated adjacent to box for shaftwall framing, provide 4-inch framing.

3.03 PARTITION SCHEDULE

0 S 1 G:

No fire rating.
Metal studs to structure.
Gypsum panels 1 side only.

0 S 40 G:

No fire rating.
Construct metal stud, gypsum panel partition per UL Des. U465.
No batts.

0 S 49 G:

No fire rating.
Construct metal stud, gypsum panel partition per UL Des. U465.
Install mineral fiber batts in stud cavities. No resilient channels.

END OF SECTION

SECTION 09 2116 - GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior metal stud wall framing.

B. Acoustic insulation.

C. Gypsum wallboard.

D. Interior gypsum ceilings/soffits.

E. Joint treatment and accessories.

1.02 REFERENCES

A. ASTM C 475/C 475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2002 (Reapproved 2007).

B. ASTM C 645 - Standard Specification for Nonstructural Steel Framing Members; 2007.

C. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2006.

D. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2007.

E. ASTM C 840 - Standard Specification for Application and Finishing of Gypsum Board; 2007.

F. ASTM C 1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2007.

G. ASTM C 1396/C 1396M - Standard Specification for Gypsum Board; 2009.

H. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2007.

1.03 SUBMITTALS

A. Product Data: Provide manufacturer's product data for systems required. Include installation instructions and data sufficient to show compliance with requirements.

B. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

C. Design Data:

1. Submit data substantiating gage and spacing of metal framing members to comply with specified loading requirements.
2. Submit data substantiating bracing requirements.
3. Submittal of manufacturer's standard published load tables, marked to show products selected to comply with design requirements and project conditions, will be acceptable. Where manufacturer's standard published load tables are not adequate to demonstrate compliance with design requirements and project conditions, submit design data bearing the seal of a professional engineer licensed to practice in the state in which the project is located.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original and unopened packages, containers, or bundles, with brand names and manufacturer's labels intact and legible.

B. Store materials in dry location, fully protected from weather and direct exposure to sunlight.

C. Stack gypsum board products flat and level, properly supported to prevent sagging or damage to ends and edges.

D. Store corner bead and other metal and plastic accessories to prevent bending, sagging, distortion, or other mechanical damage.

1.05 PROJECT CONDITIONS

A. Do not store or install products until building is fully enclosed and temperature and humidity controlled.

B. Temperature: Maintain temperature in areas of installation between 50 and 80 degrees F for at least 48 hours before installation begins and continuously thereafter.

C. Ventilation: Provide controlled ventilation and dehumidification.

D. Do not allow excessive variations in humidity or temperature.

PART 2 PRODUCTS

2.01 SUBSTITUTIONS

A. Refer to Section 01 6000 - Product Requirements.

2.02 METAL FRAMING MATERIALS

A. Non-Loadbearing Framing System Components: ASTM C 645; galvanized sheet steel of size and properties necessary to comply with ASTM C 754, for the spacing indicated.
   1. Studs: C-shaped .
      a. Nominal depths: As indicated in Section 09 0610 or as otherwise indicated on the drawings.
   2. Runners: U-shaped, sized to match studs.
      a. Nominal depths: As indicated in Section 09 0610 or as otherwise indicated on the drawings.
   3. Ceiling Channels: C-shaped, cold-rolled.
   4. Furring:
      a. Hat-shaped, minimum depth of 7/8 inch, except as otherwise indicated.
   5. Thickness: Provide thickness as required for span, loading, deflection, and other required criteria.
      a. Minimum thickness, all locations, unless otherwise indicated: 0.0188 inch design thickness / 0.0179 inch minimum base metal thickness.
      b. So-called "EQ" or "equivalent gage" framing with thickness equal to or greater than specified above is acceptable. So-called "EQ" or "equivalent gage" framing with thickness less than specified above is not acceptable.
   6. Finish: G40 hot-dip galvanized per ASTM A653.
      a. So-called "G40e" equivalent coating is not acceptable.
   7. Stud spacing: 16 inches, maximum.
   8. Furring spacing: 16 inches on center, maximum.
   9. Maximum deflection of wall framing of L/360 at 10 psf.

B. Establish bracing size and spacing for the following partitions. (See Section 09 0610 - Partition Schedule):
   1. Type A.
   2. Type SA.
   3. Type U.
   4. Type F and Z when furring is installed over spaced supports.

C. Ceiling Hangers: Type and size as specified in ASTM C 754 for spacing required.

D. Partition Head To Structure Connections:
   1. Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and screwed to secondary deflection channel set inside but unattached to top track.

2.03 GYPSUM BOARD MATERIALS

A. Gypsum Wallboard: ASTM C1396; sizes to minimize joints in place; ends square cut.
   1. Thickness: 5/8 inch, all locations. 1/2 inch not acceptable.
   2. Edges: Tapered; beveled or rounded.
   3. Type X: Fire resistant, UL or Intertek rated.

2.04 ACOUSTICAL MATERIALS

A. Sound Attenuation Batts: ASTM C 665, Type I; unfaced semirigid mineral wool batt (made from rock or slag); thickness as follows:
   1. Use 3-inch batts in 3-5/8-inch and wider studs.
   2. Where batts are required in furred spaces, use batt thickness equal to furring depth.

B. Acoustical Sealants:
   1. Concealed Locations: ASTM C919; non-drying, non-hardening, non-skinning type.
   2. Exposed Locations: ASTM C 919; non-oxidizing, skinning type.

2.05 ACCESSORIES

A. Except as otherwise specifically indicated, provide trim and accessories by manufacturer of gypsum board materials, made of galvanized steel or zinc alloy and configured for concealment in joint compound.
   1. Include corner beads, edge trim, and other trim units necessary for project conditions. Provide accessories as required in order to achieve details indicated, whether or not specific accessories are shown on the drawings.
   2. Exposed trim: At locations indicated, provide manufacturer's standard metal units designed to be left exposed or semi-exposed.

B. Corner Beads: Galvanized steel.

C. Edge Trim: L bead, as defined in ASTM C 840.

D. Control Joints: At locations indicated, provide manufacturer's standard one-piece control joints of zinc alloy.

E. Joint Materials: ASTM C 475 and as recommended by gypsum board manufacturer for project conditions.
   1. Joint Compound:
      a. General Interior Use: Ready-mixed vinyl-based joint compound. All-purpose taping and topping compound: type specifically formulated for embedding tape and accessories, for prefilling, and for finishing drywall.
   2. Joint Tape:
      a. Gypsum wallboard: Provide manufacturer's standard paper type tape.

F. Screws: ASTM C 1002; self-piercing tapping type, lengths as recommended by gypsum board manufacturer for project conditions.

G. Furring Fasteners/Connectors: Manufacturer's recommended system for specific application indicated, complying with ASTM C 754.

H. Hanger Wire: ASTM A 641, soft, Class 1 galvanized.

1. Ceiling hangers: Minimum 8 gage wire.
2. Furring channel ties: Minimum 18 gage wire.

I. Blocking: Provide metal blocking for mounting of wall cabinets, shelves, toilet accessories, etc.
1. Provide 6 inch, 16 gage, steel runner notched to bypass steel studs and secured with two 3/8 inch pan head screws.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions and substrates are appropriate for work of this section to commence.

B. Coordinate installation of anchorage devices for suspended ceilings/soffits, verifying that spacing and rated strength are correct for anticipated load conditions.

3.02 FRAMING INSTALLATION

A. Comply with ASTM C 754 and manufacturer's instructions.

B. Fire-rated assemblies: Comply with requirements of tested assemblies.

C. Studs:
1. Extend partitions to structure unless otherwise indicated.
2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
3. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.
4. Slab Deflection: At fire-rated partitions, construct slip-joint head in accordance with UL-witnessed reports and manufacturer's recommendations.

D. Partition heights:
1. Where not indicated otherwise, extend partitions from floor to underside of solid structure above.
2. Where indicated, extend partitions to underside of suspended ceiling or to just above suspended ceiling, as indicated.
a. Brace partial height partitions in accordance with design requirements specified in Part 1 of this Section.
3. Blocking and bracing: Install blocking and bracing as recommended by manufacturer for adequate support of wall-mounted items installed as work of other sections.

E. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double 20 gage, side-by-side studs at jambs on both sides of opening.
1. At openings in fire rated partitions, comply with requirements of governing authorities for framing.

F. Standard Wall Furring: Install at concrete and masonry walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
1. Orientation on solid walls: Vertical.

G. Suspended Ceilings and Soffits:
1. Secure hangers to structure or to anchorage devices so that full strength of hanger can be achieved.

a. Install ceiling channels at spacing indicated or required, but not greater than permitted by ASTM C 754.
b. Secure furring members to ceiling channels by means of clips or wire ties.

2. Level ceiling system to a tolerance of 1/8 inch in 12 feet, or to a higher tolerance if required by specific project conditions.
3. Level soffits to a tolerance of 1/8 inch in 12 feet, or to a higher tolerance if required by specific project conditions.
4. Reinforce openings and interruptions in horizontal framing system with additional furring channels. Ensure that entire suspension system is laterally braced.

3.03 ACOUSTIC INSULATION

A. Acoustic Insulation: After gypsum board has been installed on one side, place insulation tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions. Fill cavities completely, using recommendations and details indicated in USG Corporation's "Gypsum Construction Handbook".

3.04 NOISE, AIR, AND DUST CONTROL

A. General: Every partition dividing two spaces is a noise, air, and dust control partition.
1. Seal noise, air, and dust control partitions in accordance with the requirements listed below.
2. Seal gypsum panels used on the interior face of exterior walls in the same manner.
3. Seal gypsum furring panels used on masonry in the same manner.

B. Seal perimeter of partition with acoustical sealant, complying with recommendations and details in USG Corporation's "Gypsum Construction Handbook" and ASTM C 919. Do not install sealant under metal runners. Install 1/4-inch-round bead of sealant to in-place runners including those used at partition intersections. Immediately place gypsum panel so as to compress bead, leaving 1/8 inch of perimeter relief (or other dimension where indicated) between gypsum panel and adjacent construction.
1. Relief Joints: Install sealant between metal edge trim and adjacent construction. Joint size 1/4 inch unless otherwise indicated.
2. Install sealant beneath control joints.
3. Install sealant at metal door frames just before inserting face panel.
4. Carefully seal around penetrations such as electrical boxes, plumbing, cabinets, ducts, and other openings.

3.05 GYPSUM BOARD INSTALLATION

A. Comply with ASTM C 840 and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Fire-rated assemblies: Comply with requirements of tested assemblies.

C. Apply ceiling boards prior to installation of wallboards. Arrange to minimize butt end joints near center of ceiling area.

D. Install wallboards in a manner which will minimize butt end joints in center of wall area. Stagger vertical joints on opposite sides of walls.

E. Butt all joints loosely, with maximum of 1/16 inch between boards.

F. Size panels to provide perimeter relief and install over sealant as specified under noise control, above. Do not install panels unless and until sealant is properly installed.

G. Place wrapped edges adjacent to one another; do not place cut edges or butt ends adjacent to wrapped edges.

H. Support all edges and ends of each board on framing or by solid substrate, except that long edges at right angles to framing members in non-fire-rated construction may be left unsupported.

I. Single-Layer: Install gypsum board vertically, with ends and edges occurring over firm bearing.
   1. On walls and partitions, plan installation so that the leading edge or end of gypsum board is attached to open end of stud flange first.

3.06 INSTALLATION OF TRIM AND ACCESSORIES

A. Comply with manufacturer's recommendations for installation of trim items. Except for items intended by manufacturer to be left exposed or semi-exposed, install trim units for concealment in joint finishing compound. Wherever possible, fasten metal trim items to substrate with same fasteners used to install gypsum board products.

B. Control Joints: Where control joints are indicated on the drawings, place control joints as shown on the drawings. Where control joints are not indicated on the drawings, place control joints consistent with lines of building spaces and as follows:
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
   2. Install one-piece control joints at required locations. Do not remove tape until finishing operations are complete.

C. Corner Beads: Install at external corners, unless details clearly indicate its omission at specific locations. Use longest practical lengths.

D. Isolation Joints: Where gypsum board construction abuts cabinetry, windows, structural components, and other dissimilar materials, provide isolation by stopping board a minimum of 1/4 inch from structure, for finishing by means of exposed or semi-exposed trim.

3.07 JOINT TREATMENT

A. Finish gypsum board in scheduled areas in accordance with levels defined in ASTM C 840.

B. Do not mix joint compounds except as specifically recommended by manufacturer.

C. Penetrations in Wallboard: Fill cutouts and openings around fixtures and penetrations with joint compound.

3.08 CLEANING

A. Promptly remove any residual gypsum drywall materials from adjacent or adjoining surfaces, leaving spaces ready for subsequent finishing operations and decorating.

3.09 FINISH LEVEL SCHEDULE

A. Level 1: Above finished ceilings concealed from view; from 8 inches (203 mm) above suspended ceilings to top of partition.
   1. Embed tape in joint compound at all joints and interior angles; provide accessories only as detailed.
   2. Provide surfaces free of excess joint compound; tool marks and ridges are acceptable.

B. Level 2: Walls scheduled ro receive the following:
   1. Utility areas; areas behind cabinetry.
   2. Application:
      a. Embed tape in joint compound at all joints and interior angles.

b. Provide one separate coat of compound at all joints, angles, fastener heads, and accessories.
c. Provide surfaces free of excess joint compound; tool marks and ridges are acceptable.

C. Level 4: Surfaces scheduled to receive the following:
1. Flat or eggshell paint finish specified in Section 09 9100 - Paints and Coatings.
2. All surfaces not otherwise indicated.
3. Application:
a. Embed tape in joint compound at all joints and interior angles.
b. Provide three separate coats of compound at all joints, angles, fastener heads, and accessories.
c. Provide smooth surfaces free of tool marks and ridges.

END OF SECTION

SECTION 09 5100 - SUSPENDED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

C. Accessories.

1.02 SUBMITTALS

A. Product Data: Provide data on suspension system components and acoustical units.

B. Samples: Submit three samples, minimum 6 inches by 6 inches, illustrating material and finish of acoustical units.

C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

D. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, and mechanical and electrical items installed in the ceiling.

1.03 PROJECT CONDITIONS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Install acoustical units after interior wet work is dry.

1.04 EXTRA MATERIALS

A. Provide 3 percent of total acoustical unit area of each type of acoustical unit for Owner's use in maintenance of project.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

A. Manufacturers; General:
   1. Armstrong World Industries, Inc: www.armstrong.com.

B. Substitutions: Not permitted.

C. Acoustical Units (AC1):
   1. Acoustical Panel: Painted mineral fiber, ASTM E 1264, Type III, Class A, with the following characteristics determined as specified in ASTM E 1264.
      a. Size: 24 x 24 inches.
      b. Thickness: 5/8 inch.
      c. Composition: Water felted
      d. Light Reflectance: Not less than 0.81.
      e. Noise Reduction Coefficient (NRC): 0.55
      f. Ceiling Attenuation Class (CAC): 30
   2. Products:
      a. Acoustical Panel:
         1) Armstrong; Fissured Tegular 705.
      b. Suspension System:
         1) Armstrong Prelude XLFG, 15/16”, heavy duty.

D. Acoustical Units (AC2):

1. Acoustical Panel: Painted mineral fiber, ASTM E 1264, Type III, Class A, with the following characteristics determined as specified in ASTM E 1264.
   a. Size: 24 x 24 inches.
   b. Thickness: 7/8 inch.
   c. Composition: Water felted
   d. Light Reflectance: Not less than 0.86.
   e. Noise Reduction Coefficient (NRC): 0.70
   f. Ceiling Attenuation Class (CAC): 38
2. Products:
   a. Acoustical Panel:
      1) Armstrong; Cirrus Tegular 534.
   b. Suspension System:
      1) Armstrong Prelude XLFG, 15/16”, heavy duty.

2.02 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.
   1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

C. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636 and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:240.

C. Locate system on room axis according to reflected plan.

D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

I. Do not eccentrically load system or induce rotation of runners in excess of 2 degrees.

J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.

1. Use longest practical lengths.
2. Miter corners.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Lay directional patterned units with pattern parallel to shortest room axis.

D. Fit border trim neatly against abutting surfaces.

E. Install units after above-ceiling work is complete.

F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

G. Cutting Acoustical Units:
1. Cut to fit irregular grid and perimeter edge trim.
2. Make field cut edges of same profile as factory edges.
3. Double cut and field paint exposed reveal edges with manufacturer's recommended paint.

H. Where round obstructions occur, provide preformed closures to match perimeter molding.

3.04 ERECTION TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

END OF SECTION

SECTION 09 6010 - FLOORING TRANSITIONS

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data.

B. Verification Samples: Submit two samples, 6 by 6 inch in size illustrating color and pattern for each product specified.

PART 2 PRODUCTS

	CARPET	TERRAZZO	RESILIENT FLOORING	WOOD	TILE - AT DOOR	TILE - FIELD	RESINOUS FLOORING	EXPOSED CONCRETE
CARPET	N							
TERRAZZO	A	M						
RESILIENT	F	B	H					
WOOD	K	C	K	N				
TILE - AT DOOR	L	L	L	L	L			
TILE - FIELD	A	C	B	D	N	N		
RESINOUS FLOORING	A	C	C	J	L	B	M	
EXPOSED CONCRETE	G	E	G	J	L	E	C	N

* NOTE: FLOORING KEYED INTO SLAB.

DESCRIPTION

F Resilient Johnsonite CTA-XX-H, 1/8" to 1/4"

H Resilient Johnsonite CTA-XX-X, 0.80" to 1/8"

J Resilient Johnsonite CTA-XX-D, 0" to 1/2"

K Resilient Johnsonite CD-XX-B, 1/8" to 1/2"

L Marble Threshold.

N No Transition Required.

PART 3 EXECUTION

3.01 INSTALLATION

A. Coordinate and install transitions between each type of flooring in accordance with the table above and the respective flooring specifications.

END OF SECTION

SECTION 09 6500 - RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient sheet flooring.
   1. Slip Resistant Vinyl sheet flooring.

B. Resilient base.

C. Installation accessories.

1.02 SUBMITTALS

A. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

B. Test Reports: See requirements specified in Section 09 0561 - Preparation for Adhesively Installed Flooring.

C. Verification Samples: Submit two samples, 6 by 6 inch in size illustrating color and pattern for each product specified.

D. Welded Seams: Submit two samples of two adjoining 6 by 12 inch sections of resilient flooring welded as specified and mounted on back board for each product specified.

1.03 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.04 EXTRA MATERIALS

A. Provide 5 percent of installed resilient product of each type and color specified.

PART 2 PRODUCTS

2.01 SUBSTITUTIONS

A. Refer to Section 01 6000 - Product Requirements.

2.02 MATERIALS - SHEET FLOORING

A. Slip Resistant Vinyl Sheet Flooring: ASTM D 2047, vinyl sheet floor covering with non-woven polyester/cellulose glass fiber reinforcement scrim backing and colored quartz aggregate throughout wear layer thickness.
   1. Total Thickness and Wear Layer Thickness: 2.0 mm / 0.08 inch nominal.
   2. Sheet Width: 2.0 m / 79 inches minimum.
   3. Seams: Heat welded.
      a. Rod color: Manufacturer's recommended color to match sheet flooring.
   4. Basis of Design Product:
      a. Altro Walkway 20
         1) Color: TBD

2.03 MATERIALS - BASE

A. Resilient Base: ASTM F 1861, Type TS vulcanized thermoset rubber.
   1. Height: 4 inches.

2. Thickness: 0.125 inch thick.
3. Finish: Matte.
4. Style: Cove.
5. Length: Roll, 100-120 feet.
6. Products:
   a. Allstate Rubber Corp; Wall Base: www.allstaterubber.com.
   b. BurkeMercer Flooring; Burkebase: www.burkemercer.com.
   c. Flexco; Wallflowers: www.flexcofloors.com.
   d. Roppe Corp; Pinnacle: www.roppe.com.
7. Color: TBD

2.04 ACCESSORIES

A. Subfloor Filler: Portland cement-based premix latex; type recommended by flooring manufacturers.

B. Primers and Adhesives: Type recommended by flooring manufacturers.
   1. Where high moisture or pH conditions exist, see additional requirements specified in Section 09 0561 - Preparation for Adhesively Installed Flooring.

C. Sealer and Wax/Finish Products: Types recommended by flooring manufacturer.

D. Transitions:
   1. Products: Refer to Section 09 6010 Flooring Transitions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are smooth and flat within the tolerances specified for that type of work, are free of substances which would impair bonding of adhesive materials, and are ready to receive resilient product.

B. Verify that concrete subfloor surfaces are ready for resilient flooring installation by testing for moisture and alkalinity as spcified in Section 09 0561 - reparation for Adhesively installed Flooring. If test results are not within limits recommended by flooring manufacturer, follow procedures specified in Section 09 0561.

3.02 PREPARATION

A. Clean substrate.

3.03 INSTALLATION - SHEET FLOORING

A. Install in accordance with manufacturer's instructions.

B. Spread only enough adhesive to permit installation of materials before initial set.

C. Set flooring in place, press with heavy roller to attain full adhesion.

D. Lay flooring with joints and seams parallel to longer room dimensions to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns carefully at seams.

E. Underscribe sheet material and rout seams. Heat weld with manufacturer's recommended type welding rod.

F. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.

G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated. Secure metal strips with stainless steel screws. Secure resilient strips with adhesive.

H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - BASE

A. Cut vertical joints and fit tightly. Maintain minimum dimension of 18 inches between joints.

B. At external corners, v-cut back of base strip to two-thirds of its thickness and fold.

C. Miter cut internal corners.

D. Install base on solid backing. Bond tightly to surfaces.

E. Scribe and fit to door frames and other interruptions.

3.05 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean, seal, and wax resilient flooring products in accordance with manufacturer's instructions.

3.06 PROTECTION OF FINISHED WORK

A. Prohibit traffic on resilient flooring for 48 hours after installation.

B. Protect installed products until completion of project.

END OF SECTION

SECTION 09 6800 - CARPET

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Carpet, direct-glued.

B. Carpet tile, fully adhered.

C. Accessories.

1.02 REFERENCES

A. ASTM D 2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2006.

B. ASTM E 648 - Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2008.

C. CRI (GLA) - Green Label Testing Program - Approved Adhesive Products; www.carpet-rug.org; current edition.

D. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; National Fire Protection Association; 2006.

1.03 SUBMITTALS

A. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

B. Manufacturer's Installation Instructions: Indicate special procedures.

C. Samples: Submit two samples full size of carpet tile, 24 x 24 inch for broadloom illustrating color and pattern for each carpet specified.

D. Shop Drawings: Indicate seaming plan, method of joining seams, direction of carpet pile and pattern.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing carpet with minimum three years experience.

C. Warranty: Minimum 15years on materials.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

B. Maintain minimum 70 degrees F ambient temperature 24 hours prior to, during and 24 hours after installation.

C. Ventilate installation area during installation and for 72 hours after installation.

1.06 MAINTENANCE

A. Extra Materials
   1. Provide 120 sq ft of broadloom carpeting of each type, color, and pattern specified.
   2. Provide one box of carpet tiles of each color and pattern selected.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Carpet:

1. C & A Floorcoverings, Inc/Tandus: www.tandus-centiva.com.

2.02 CARPET

A. Carpet Type Broadloom: Tufted, 100% solution dyed nylon, conforming to the following criteria:
   1. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E 648 or NFPA 253.
   2. Surface Flammability Ignition: Pass ASTM D 2859 (the "pill test").
   3. Color: Reference Finish Legend on sheet A700.
   4. Pattern: Reference Finish Legend on sheet A700.
   5. Roll Width: 12 ft.
   6. Pile Height: minimum adverage 0.187"
   7. Stitches: minimum 10 per inch.
   8. Nylon Fiber system 6 or 6-6

2.03 CARPET TILE

A. Carpet Tile Type level loop: Tufted, manufactured in one color dye lot.
   1. Product: Reference Finish Legend on Sheet A700.
   2. Tile Size: 24 x 24 inch, nominal.
   3. Pile Height: minimum adverage 0.187"
   4. Stitches: minimum 10 per inch.
   5. Nylon Fiber system 6 or 6-6

2.04 ACCESSORIES

A. Adhesives: Type recommended by flooring manufacturers.
   1. Where high moisture or pH conditions exist, see additional requirements specified in Section 09 0561 - Preparation of Concrete to Receive Adhesively Installed Flooring.

B. Seam Adhesive: Recommended by manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive carpet.

B. Verify that sub-floor surfaces are dust-free and free of substances which would impair bonding of adhesives to sub floor surfaces.

C. Verify that concrete subfloor surfaces are ready for flooring installation by testing for moisture and alkalinity as specified in Section 09 0561 - Preparation ofConcrete to Receive Adhesively Installed Flooring. If test results are not within limits recommended by flooring manufacturer, follow procedures specified in Section 09 0561.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.

B. Clean substrate.

3.03 SITE ENVIRONMENTAL PROCEDURES

A. Indoor Air Quality:
   1. Temporary ventilation:

a. Ventilate products prior to installation. Remove from packaging and ventilate in a secure, dry, well-ventilated space free from strong contaminant sources and residues. Provide a temperature range of 60 degrees F minimum to 90 degree F maximum continuously for minimum 72 hours. Do not ventilate within limits of Work unless otherwise approved by Architect.

2. Immediately after installation, clean carpet thoroughly with a [high-efficiency particulate air (HEPA) filtration vacuum] [certified CRI Green Label vacuum cleaner].

3.04 CARPET INSTALLATION - GENERAL

A. Verify carpet match before cutting to ensure minimal variation between dye lots.

B. Lay out carpet and locate seams in accordance with shop drawings:
1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
2. Do not locate seams perpendicular through door openings.
3. Locate change of color or pattern between rooms under door centerline.
4. Provide monolithic color, pattern, and texture match within any one area.

C. Install carpet tight and flat on subfloor.

3.05 DIRECT-GLUED CARPET

A. Double cut carpet seams, with accurate pattern match. Make cuts straight, true, and unfrayed. Apply seam adhesive to cut edges of woven carpet immediately.

B. Apply contact adhesive to floor uniformly at rate recommended by manufacturer. After sufficient open time, press carpet into adhesive.

C. Apply seam adhesive to the base of the edge glued down. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.

D. Roll with appropriate roller for complete contact of adhesive to carpet backing.

E. Trim carpet neatly at walls and around interruptions.

3.06 CARPET INSTALLATION ON STAIRS

A. Install tackless strips at back of treads, with pins facing riser, and at bottom of riser, with pins facing tread.

B. Install carpet on stairs with the run of the pile in opposite direction of anticipated traffic to avoid peaking of backing at nosings.

3.07 CARPET TILE INSTALLATION

A. Install carpet tile in accordance with manufacturer's instructions and CRI 104.

B. Blend carpet from different cartons to ensure minimal variation in color match.

C. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

D. Locate change of color or pattern between rooms under door centerline.

E. Fully adhere carpet tile to substrate.

F. Trim carpet tile neatly at walls and around interruptions.

G. Complete installation of edge strips, concealing exposed edges.

3.08 CLEANING

A. Remove excess adhesive from floor and wall surfaces without damage.

B. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09 9100 - PAINTS AND COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Paints and Coatings on Interior Substrates.
   1. Ferrous metals.
   2. Gypsum board.
   3. Gypsum board ceilings.

D. Paints and coatings on previously painted surfaces.

E. See Schedules at end of this Section.

1.02 REFERENCES

A. ASTM D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2007.

B. ASTM D 523 - Standard Test Method for Specular Gloss; 1989 (Reapproved 1999).

C. ASTM D 4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2007.

D. Steel Structures Painting Manual, Vol. 2; Systems and Specifications; Steel Structures Painting Council (SSPC); 2008 Edition.
   1. SSPC-SP 1 - Solvent Cleaning; 1982 (Ed. 2004) (Part of Steel Structures Painting Manual, Vol. Two).
   2. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).
   3. SSPC-SP 3 - Power Tool Cleaning; 1982 (Ed. 2004).
   4. SSPC-SP 7 - Brush-Off Blast Cleaning; 2006.
   5. SSPC-SP 11 - Power Tool Cleaning to Bare Metal; 1987 (Ed. 2004) (Part of Steel Structures Painting Manual, Vol. Two).

1.03 DEFINITIONS

A. Conform to ASTM D 16 for interpretation of terms used in this section.

B. Gloss Ranges: Tested in accordance with ASTM D 523.
   1. Flat refers to a lusterless or matte finish with a gloss range between 0 and 5 when measured at a 60-degree meter.
   2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
   3. Satin refers to low-to-medium-sheen finish with gloss range between 15 and 35 when measured at a 60-degree meter.
   4. Semi-gloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
   5. Gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

1.04 SUBMITTALS

A. Product Data: Provide data on all finishing products including:
   1. Manufacturer name.
   2. Product Type.
   3. Product Name.

4. Product Number.
5. Color.

B. Samples:
1. Submit two painted samples, illustrating each combination of color and sheen and textures with specified coats cascaded. Submit on hardboard unless otherwise indicated, 12 x 12 inch in size.

C. Manufacturer's Instructions: Indicate special surface preparation procedures.

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing. Information shall be legible.

C. Use of off-brand containers or mixing buckets will not be allowed on the site.

D. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions. Protect from freezing.

1.06 PROJECT CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Application Temperatures for Waterborne Paints: Minimum 45 degrees F for interiors; minimum 50 degrees F for exterior; maximum 90 degrees F (32 degrees C), unless required otherwise by manufacturer's instructions. Maintain interior temperatures until paint is completely dry and cured.

C. Application Temperatures for Solvent Thinned Paints: Minimum 50 degrees F (10 degrees C) for interiors and exterior; maximum 95 degrees F (35 degrees C), unless required otherwise by manufacturer's instructions. Maintain interior temperatures until paint is completely dry and cured.

D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

E. Ventilation: Ventilate affected areas during paint application. Exhaust solvent vapors outdoors, away from air intakes and people.

PART 2 PRODUCTS

2.01 SUBSTITUTIONS

A. Refer to Section 01 6000 - Product Requirements.

2.02 MANUFACTURERS - PAINTS

A. Benjamin Moore & Co: www.benjaminmoore.com.

B. PPG Architectural Finishes, Inc.: www.ppgaf.com.

C. The Sherwin-Williams Co: www.sherwin-williams.com.

2.03 PAINTS AND COATINGS - GENERAL

A. Do not use insecticides in paint materials

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

3.02 PREPARATION

A. General:
   1. Start of the surface preparation or paint materials application will be construed as applicator's acceptance of the surfaces as satisfactory for application of materials.
   2. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
   3. Surfaces: Correct defects and clean surfaces of substances which affect work of this section. Remove or repair existing coatings that exhibit surface defects.
   4. Marks: Seal with sealer compatible with primer and finish coats marks which may bleed through surface finishes.
   5. Impervious Surfaces: Remove mildew by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
   6. Reduce the gloss of glossy surfaces to be painted.
   7. Fill nail holes, cracks, chips, spalls, and similar damaged areas to match adjacent undamaged areas.
   8. Paint Removal:
      a. Remove flaking, cracking, blistering, peeling or otherwise deteriorated paint and paint failing adhesion testing, by scraping with hand scrapers.
      b. After scraping, remove large areas of paint on architectural details using sanders, heat guns or heat plates, or chemical paint removers. Do not use flame heat devices.
      c. When chemical strippers are used, neutralize substrate after stripping to a pH of 5 to 8.5.
      d. Remove paint to bare substrate or first sound paint layer.
      e. Paint removal shall not damage or mar the substrate material.
      f. After paint removal, featheredge and sand edges smooth of remaining chipped paint.

B. Uncoated Ferrous Metal Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing in accordance with SSPC SP-2, or sandblasting in accordance with SSPC SP-7; clean by washing with solvent or detergent in accordance with SSPC SP-1. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

C. Shop-Primed Ferrous Metal Surfaces to be Finish Painted:
   1. Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous.
   2. In flat, exposed surfaces to receive semi-gloss or gloss finish, fill dents, holes and similar voids and depressions in flat exposed surfaces with metal filler compound. Finish flush with adjacent surfaces.
   3. Clean surfaces with solvent in accordance with SSPC SP-1.

4. Prime bare steel surfaces immediately upon detection.

D. Gypsum Board Surfaces to be Painted:
   1. Fill minor defects with filler compound. Spot prime defects after repair.
   2. Remove loose dust and dirt by brushing with a soft brush, rubbing with a cloth, or vacuum cleaning. A damp cloth may be used when water based paint materials are to be applied. Allow to dry.

E. Previously Painted Surfaces:
   1. Thoroughly remove all grease, dirt, dust or other foreign matter.
   2. Remove coatings that are blistering, cracking, flaking, peeling, or otherwise deteriorating.
   3. Roughen slick surfaces.
   4. Repair damaged areas such as, but not limited to, nail holes, cracks, chips, and spalls with suitable material to match adjacent undamaged areas.
   5. Feather edge edges of chipped paint, and sand smooth.
   6. Clean metal surfaces in accordance with SSPC requirements using solvent, mechanical, or chemical cleaning methods to provide surfaces suitable for painting. Preparation of ferrous surfaces if not specified shall as recommended by coating manufacturer, but in no case less than SSPC SP-3.
   7. Chalk shall be removed so that when tested in accordance with ASTM D 4214, the chalk resistance rating is no less than 8.

3.03 APPLICATION

A. Unless otherwise specified or recommended by the paint manufacturer, paint may be applied by brush, roller, or spray. Rollers for applying paints and enamels shall be of a type designed for the coating to be applied and the surface to be coated.
   1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
   2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
   3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.

B. Thinning:
   1. When thinning is required to suit surface, temperature, weather conditions, or application methods, paints may be thinned in accordance with the manufacturer's directions.
   2. The use of thinner shall not relieve the Contractor from obtaining complete hiding, full film thickness, or required gloss. Thinning shall not cause the paint to exceed limits on volatile organic compounds.

C. Do not mix paint materials of different manufacturers.

D. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

E. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Minimum Coating Thickness:
   1. Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness as recommended by manufacturer. Provide total dry film thickness of the entire system as recommended by manufacturer.

2. Strip paint to ensure that all edges, corners, crevices, welds, and rivets receive a film thickness equal to that of adjacent painted surfaces.
3. Apply each coat of paint so dry film shall be of uniform thickness and free from runs, drops, ridges, waves, pinholes or other voids, laps, brush marks, and variations in color, texture, and finish. Hiding shall be complete. If application thickness or color and opacity of the paint do not achieve complete hiding, apply additional coat(s) to achieve complete hiding without change in contract price.

3.04 INTERIOR WALL AND CEILING JOINTS

A. Sealant-Type Expansion Joints in Gypsum Wallboard:
1. Ensure that backer rod and joint sealant (specified in Division 7) are completed and cured prior to application of paint.

B. Fillet Joints between Hollow Metal Door Frames and Adjacent Walls (and similar locations):
1. Ensure that backer rod and joint sealant (specified in Division 7) are completed and cured prior to application of paint.

3.05 REPAIR AND RESTORATION

A. Reinstall and unmask electrical plates, hardware, light fixture trim, escutcheons, and fittings that were removed or masked prior to preparing surfaces or finishing.

B. Restore to original condition surfaces damaged or marred by painting materials application.

C. Remove, refinish, or repaint work not complying with approved samples and other specified requirements.

3.06 PROTECTION AND CLEANING

A. Collect waste material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.07 SCHEDULE - SURFACES TO BE FINISHED

A. Do Not Paint or Finish the Following Items:
1. Items fully factory-finished unless specifically noted.
2. UL, FMG, or other code required labels; fire rating labels; and equipment name, identification, performance rating, serial number and capacity labels.
3. Stainless steel items.
4. Concealed surfaces including, but not limited to, the following:
a. Furred areas.
b. Ceiling plenums.

B. Paint the surfaces described in Schedules at the end of this Section and as follows:
1. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of permanently fixed equipment or furniture, paint surfaces behind permanently fixed equipment or furniture with primer only.

3.08 INTERIOR PRIMERS, SEALERS, AND FILLERS

A. Interior Acrylic Primer for Gypsum Board:
1. Benjamin Moore & Co.; 231 EcoSpec Interior Latex Primer Sealer. (0 g/l)
2. PPG Architectural Finishes, Inc.; 6-4900XI Speedhide Zero VOC Interior Primer. (0 g/l)
3. The Sherwin-Williams Co.; B28W02600 ProMar 200 Zero VOC Interior Latex Primer. (0 g/l)

B. Interior Acrylic Primer for Ferrous Metal:
1. Benjamin Moore & Co.; M04 IMC Acrylic Metal Primer. (54 g/l)

2. PPG Architectural Finishes, Inc.; 90-712 Pitt-Tech Primer/Finish DTM Industrial Enamel. (123 g/l)
3. The Sherwin-Williams Co.; B66W1 Direct To Metal Acrylic Primer & Finish. (138 g/l)

3.09 INTERIOR FINISH COATS

A. Flat Acrylic Finish Coats for Gypsum Board:
   1. Benjamin Moore & Co.; 219 Eco Spec Interior Latex Flat. (0 g/l)
   2. PPG Architectural Finishes, Inc.; 6-4110XI Speedhide Zero VOC Flat Interior Latex. (0 g/l)
   3. The Sherwin-Williams Co.; ProMar 200 Zero VOC Flat, B30-2600. (0 g/l)

B. Eggshell Acrylic Finish Coats for Gypsum Board:
   1. Benjamin Moore & Co.; 223 Eco Spec Interior Latex Eggshell Enamel. (0 g/l)
   2. PPG Architectural Finishes, Inc.; 6-4310XI Speedhide Zero VOC Interior Eggshell Latex. (0 g/l)
   3. The Sherwin-Williams Co.; ProMar 200 Zero VOC Eg-Shel, B20-2600. (0 g/l)

C. Semi-Gloss Acrylic Finish Coats for Ferrous Metal:
   1. Benjamin Moore & Co.; IMC M29 DTM Acrylic Semi-Gloss Enamel. (207 g/l)
   2. PPG Architectural Finishes, Inc.; 90-474 Pitt-Tech Int/Ext Satin DTM Industrial Enamel. (227 g/l)
   3. The Sherwin-Williams Co.; B66-200 Series DTM Acrylic Coating, Semi Gloss. (208 g/l)

3.10 PRIMER, INTERMEDIATE, AND TOP COAT COLORS

A. Except where coating materials cannot be tinted, tint each successive (primer, intermediate, top) coat of paint a sufficiently contrasting color to facilitate identification of complete coating coverage. The preceding coat may be in the same color family, but shall be noticeably different. Provide additional top coats without change in Contract Price if necessary to achieve complete hiding and uniform sheen.

B. Top coat colors are indicated on the drawings and schedules. For approval of actual colors, see sample and mock-up requirements specified above.

C. Top coat colors of manufacturers listed on the Finish Schedule (or elsewhere) indicate the required color, only, and do not indicate the required brand name product, which shall be as specified in above.

D. Top Coat Colors:
   1. Before submitting samples for approval and before purchasing project quantities of material, confirm with the Architect that colors have not changed based on awarded flooring, tile, and countertop finishes.

3.11 PAINT SYSTEMS - INTERIOR

A. Ferrous Metals:
   1. First Coat: Primer.
   2. Two Top Coats: Semi-gloss acrylic finish.

B. Gypsum Board:
   1. First Coat: Acrylic primer.
   2. Two Top Coats: Eggshell acrylic enamel finish.

C. Gypsum Board Ceilings:
   1. First Coat: Acrylic primer.

2. Two Top Coats: Flat latex paint finish.

END OF SECTION

SECTION 10 1101 - VISUAL DISPLAY BOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Factory Assembled Units:
   1. Markerboards.

1.02 REFERENCES

A. ASTM A 424 - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2006.

1.03 SUBMITTALS

A. Product Data: Provide manufacturer's data on products specified.

B. Selection Samples: Submit manufacturer's complete set of color samples for each product specified.

C. Verification Samples: Submit two samples 2 by 2 inches in size illustrating materials, finish, color, and texture of each product specified.

D. Manufacturer's printed installation instructions.

E. Maintenance Data: Manufacturer's cleaning and maintenance instructions covering both routine and long-term operations.

F. Shop Drawings:
   1. Include types of units provided, location within each room, and size of each unit.
   2. Include dimensioned elevation drawings of each board assembly indicating joint locations and type of joint where required, and board mounting distances from floors.
   3. Include cross-section details showing each type of product and components; trim, marker/chalk tray, face, core, backing materials and thickness, and key to elevations.
   4. Show locations and quantities of accessories.
   5. Show anchorage and installation details.

G. Warranty: Executed copy of manufacturer's warranty.

1.04 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain visual display boards of each type from a single source.

1.05 WARRANTY

A. Provide lifetime warranty for porcelain enamel steel markerboard and chalkboard writing surfaces when installed in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Claridge Products: www.claridgeproducts.com.

B. Platinum Visual Systems: www.pvsusa.com.

2.02 MATERIALS

A. Writing Surface: ASTM A 424, Type I, Porcelain enamel on steel.
   1. Metal Face Sheet Thickness: 0.024 inch (24 gage).
   2. Hardboard Face Sheet Thickness: 1/4 inch.

B. Core:
   1. Single Unit Core: Particleboard laminated to face sheet.
   2. Spliced Unit Core: MDF laminated to face sheet.
   3. Backing: 0.005 inch thick aluminum foil, laminated to core.

C. Frame: T5 tempered 6063 alloy extruded aluminum, with concealed fasteners.

D. Accessories:
   1. Continuous chalk/marker tray with end caps.
   2. Continuous tack strip with solid color composite cork strip across top of unit.
   3. One dry erase marker kit, for every 12 lineal feet of marker board, consisting of 3 different colored markers, 1 eraser, and 8 ounces of cleaning fluid.

2.03 FACTORY ASSEMBLED UNITS

A. Factory-assembled units in a single frame, of materials specified above.
   1. Join panels of different construction with H-shaped extruded aluminum molding finished to match frame.
   2. Join panels of similar construction with butt joints, aligned and secured with steel spline concealed in edge of core.
   3. Configuration: As indicated on drawings.

B. Products:
   1. Claridge Products: Series 4.
      a. Markerboard: Gloss finish; Color 32 White .
   2. Platinum Visual Systems: DTS.
      a. Markerboard: Gloss finish; Color 454 Bright White.

2.04 FACTORY ASSEMBLED UNIT FABRICATION

A. Laminate facing sheet and backing sheet to core material under pressure, using manufacturer's recommended adhesive.

B. Where butt jointed spliced panels are required use MDF core.

C. Provide factory-assembled visual display boards, except where sizes demand partial field assembly.

D. Assemble units in one piece without joints, wherever possible. Where required dimensions exceed maximum panel size available, provide two or more pieces of equal length, as indicated on approved shop drawings. Assemble to verify fit at factory, then disassemble for delivery and final assembly at project site.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated on drawings.

B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as instructed by manufacturer.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Secure units level and plumb.

C. Butt Joints: Install with tight hairline joints.

3.03 CLEANING

A. Clean board surfaces in accordance with manufacturer's instructions.

END OF SECTION

SECTION 10 1400 - SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Room and door signs.

1.02 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.

1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
3. Submit for approval by Owner through Architect prior to fabrication.

C. Samples: Submit one sample of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Package room and door signs in sequential order of installation, labeled by floor or building.

C. Store tape adhesive at normal room temperature.

1.06 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Flat Signs:

1. Basis of Design: ASI InTac / WS Series.

2.02 SIGNAGE APPLICATIONS

A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 2017, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
   1. Sign Type: Flat signs with applied character panel media as specified.
   2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
   3. Character Height: 1 inch.
   4. Sign Height: 8 inches, unless otherwise indicated.
   5. Office and Classroom Doors (Sign Type B.2): Identify with room numbers to be determined later, not the numbers indicated on drawings.
   6. Conference and Meeting Rooms (Sign Type C.1): Identify with room names and numbers to be determined later, not those indicated on drawings; in addition, provide "window" section with sliding "In Use/Vacant" indicator.
   7. Service Rooms (Sign Type B.2): Identify with room names and numbers to be determined later, not those indicated on drawings.

2.03 SIGN TYPES

A. Flat Signs: Signage media without frame.
   1. Edges: Square.
   2. Corners: Radiused.
   3. Wall Mounting of One-Sided Signs: Tape adhesive.

B. Color and Font: Unless otherwise indicated:
   1. Character Font: Helvetica Neue 65 Medium.
   2. Character Case: Upper case only.
   3. Background Color: Silver Gray Gravotac.
   4. Character Color: White color.

2.04 TACTILE SIGNAGE MEDIA

A. Applied Character Panels: Acrylic plastic base, with applied acrylic plastic letters and braille.
   1. Total Thickness: 1/8 inch.
   2. Letter Thickness: 1/32 inch.
   3. Letter Edges: Square.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install neatly, with horizontal edges level.

3.02 SCHEDULE

A. Sign Type B.2
   1. Doors: 202A, 202B, 216A, 216B, 233A, 311 and 341

B. Sign Type C.2
   1. Copy: 233, EVENT SPACE

END OF SECTION

SECTION 11 3013 - RESIDENTIAL APPLIANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Kitchen appliances.

1.02 REFERENCE STANDARDS

A. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.03 SUBMITTALS

A. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.

B. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).

PART 2 PRODUCTS

2.01 KITCHEN APPLIANCES

A. Ice Maker: Under the Counter, built-in.
   1. Capacity: Capable of producing up to 48 pounds of ice per day. Total minimum ice bin holding capacity of 26 pounds.
   2. Features: Interior LED lighting, clean indicator light
   3. Accessories:
      a. Ice Scoop
      b. Drain pump kit.
   4. Manufacturers:
      a. Basis of Design: GE Appliances; Model UCC15NJII; www.geappliances.com/#sle

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify utility rough-ins are provided and correctly located.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.03 ADJUSTING

A. Adjust equipment to provide efficient operation.

3.04 CLEANING

A. Remove packing materials from equipment and properly discard.

B. Wash and clean equipment.

END OF SECTION

SECTION 12 3600 - COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Solid Surface Countertops with Undermount Sinks.

1.02 REFERENCES

A. ISSFA-2 - Classification and Standards for Solid Surfacing Material; International Solid Surface Fabricators Association; 2001 (2002).

B. PS 1 - Structural Plywood; 2007.

1.03 SUBMITTALS

A. Product Data: Provide data on specified component products.

B. Samples: Submit two samples of countertop, 2 x 2 x 1/2 inch in size, illustrating color, texture, and finish.

C. Shop Drawings: Indicate dimensions, thicknesses, backsplashes, sidesplashes, required clearances, materials, colors, finishes, field jointing, adjacent construction, design load parameters, methods of support, and anchorages.
   1. Indicate integration of plumbing components.

D. Manufacturer's Installation Instructions.
   1. Indicate preparation of opening required.

E. Maintenance Data: Indicate list of approved cleaning materials and procedures required; list of substances that are harmful to component materials.
   1. Include instructions for stain removal, surface and gloss restoration.

1.04 QUALITY ASSURANCE

A. Fabricator: Manufacturer's authorized fabricator.

1.05 PROJECT CONDITIONS

A. Verify that field measurements are as indicated.

B. Sequence Work to permit installation of plumbing rough-in.

PART 2 PRODUCTS

2.01 SUBSTITUTIONS

A. Refer to Section 01 6000 - Product Requirements.

2.02 SOLID SURFACE MATERIAL

A. Solid Surface Sheet: Non-porous blend of polyester or acrylic alloys and fillers.
   1. Comply with ISSFA-2.
   2. Capable of being worked and repaired using standard woodworking tools.
   3. No surface coating. Color and pattern consistent throughout thickness.

B. Flat Sheet Thickness: 1/2 inch sheet thickness. Provide total thickness indicated on drawings.

C. Color: As scheduled, or as selected by the Architect from manufacturer's full range.

D. Joint Adhesive: Manufacturer's standard adhesive to create invisible, nonporous joints with a chemical bond.

E. Sinks: Refer to Section 22 4000 for undermount sinks.

F. Bowl Mounting Hardware: Manufacturer's approved bowl clips, brass inserts, and fasteners for attachment of undermount bowls.

G. Supporting Substrate: Plywood, PS 1 Exterior Type, AC veneer grade, minimum 5-ply; not less than 3/4 inch thick.
   1. Join lengths using metal splines.
   2. Provide cutouts in plywood for heat release as required by manufacturer.

2.03 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.

B. Provide holes and cutouts for plumbing accessories as indicated on shop drawings.

C. Solid Surface:
   1. Form joints between components using manufacturer's standard joint adhesive. Joints shall be invisible in appearance and without voids. Attach 4 inch wide reinforcing strip under joints as required by manufacturer.
   2. Rout and finish component edges to a smooth, uniform finish.
   3. Rout cutouts then sand edges smooth.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates. Identify conditions detrimental to proper or timely installation. Do not commence installation until conditions have been corrected.

3.02 INSTALLATION

A. Install components plumb, level true and straight in accordance with approved shop drawings, project installation details and manufacturer's printed instructions. Shim as necessary using concealed shims.

B. Provide inconspicuous joints in finished work.

3.03 INSTALLATION - COUNTERTOPS

A. Attach top securely to base unit or support brackets.

B. Provide side splashes where countertops abut vertical walls.

C. Provide back splashes where countertops abut vertical walls.

D. For solid surface backsplashes, provide hard seamed coved backsplash with 1/4 inch radius.

E. Adhere undermount sinks to countertop using manufacturer's recommended adhesive and mounting hardware.

F. Coordinate plumbing installation with Division 23.

3.04 CLEANING

A. Clean fabrication surfaces in accordance with manufacturer's instructions.

3.05 PROTECTION OF FINISHED WORK

A. Protect surfaces from damage until date of Substantial Completion. Replace damaged components that cannot be repaired to Architect's satisfaction.

B. Review maintenance procedures and warranty with Owner's representative upon completion of project.

END OF SECTION

SECTION 18-00-00 CARD READER SYSTEM

PART 1 - GENERAL

1.1 The Panther Card System is Georgia State University's implementation of Blackboard Transaction System – UNIX Edition. Most hardware and software is proprietary and can only be purchased from Blackboard. Use of components provided by any source other than Blackboard requires prior approval from Georgia State University.

1.2 The cabling for the loop interfaces is done with BLUE plenum rate CAT 5e cable. The Blackboard readers use a 2-pair RS-485 interface to communicate with either a Blackboard line-driver or to a Blackboard IPCONVERTER. The cable to be run between the Blackboard readers and the card swipes will be WHITE plenum rated CAT 5e cable. This is to differentiate it from the loop interface cable.

1.3 Type of cabling needed between the Card Reader and the lock-sets depends on several factors. This should be discussed with GSU PM and GSU IS&T on a per project basis, especially if the doors are required to be wired into the building fire-alarm system.

1.4 Blackboard Card readers shall not be located in random unsecured locations. Install Blackboard Card readers in common secured areas, generally data-closets on the same floor. However, the decision on whether or not to install any specific readers in a data-closet is to be evaluated on a per project basis. GSU's IS&T Department must sign-off on the actual physical placement of any equipment on the walls in a data-closet.

END OF SECTION

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SECTION 220100 GENERAL PLUMBING REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide the necessary interface with other Divisions to provide a complete project. Carefully check the Documents of this Division with those Documents of other Divisions. Determine the requirements of any interfacing materials or equipment being furnished and/or installed by those Sections and Divisions, and provide proper installation and required interface.

B. No deviation from the Contract Documents shall be made without the written consent of the Architect and Engineer.

C. All Specifications and Drawings are to be considered together as the Contract Documents. Any work shown in one and not the other, or is implied by either, shall be provided to make a complete project. Should conflicts exist between the Specifications and Drawings or there is an item shown or noted for which is not clearly defined, immediately submit a request for clarification. Under no circumstance will conflicts between the Specifications and Drawings be grounds for additional cost to the Contract after the Contract is established.

D. The Drawings are schematic and are not intended to show the exact location of piping, equipment, etc.

E. Dimensions and information regarding accurate locations of equipment, and structural limitations and finish shall be coordinated and verified with other Divisions of Work. Be prepared to furnish dimensions and information regarding the Work of this Division to other trades. Coordination with other Divisions shall be demonstrated on the shop drawings.

F. The right is reserved to relocate any device (receptacle, switch, fire alarm, audio/visual, junction box, outlet, etc.) a maximum of 10’-0” before it is permanently installed without incurring additional cost to the Contract.

1.02 REFERENCE STANDARDS

A. All work shall comply with the most recently revised versions of all local, state and federal codes, ordinances of the authority having jurisdiction, laws, rules and regulations. Any modifications required by any of the above shall be made without any additional cost to the Owner. Where requirements between governing Codes and Regulations vary, the more restrictive provision shall apply.

B. Nothing contained in the Contract Documents shall be construed as authority or permission to disregard legal requirements and regulations. The Contractor shall thoroughly review the Documents and bring any such conflicts to the attention of the Architect and Engineer prior to Installation.

C. All materials, installation, and workmanship shall comply standards and/or codes of the following:
   1. International Building Code – 2012 edition, with latest Georgia amendments
   2. International Mechanical Code - 2012 edition, with latest Georgia amendments
   3. International Plumbing Code - 2012 edition, with latest Georgia amendments
   4. International Gas Code - 2012 edition, with latest Georgia amendments
   5. International Fire Code - 2012 edition, with latest Georgia amendments
   6. International Energy Conservation Code - 2009 edition, with latest Georgia amendments
   7. National Electrical Code, 2017 Edition
   8. National Fire Protection Association
   9. State of Georgia (ANSI 117.1) Handicap Code
   10. ANSI - American National Standards Institute
   11. ASTM - American Society of Testing and Materials
   12. NEMA - National Electrical Manufacturer's Association
   13. OSHA - Occupational Safety and Health Act
   14. UL - Underwriter's Laboratories
   15. ASHRAE - American Society of Heating and Air Conditioning Engineers
   16. SMACNA - Sheet Metal and Air Conditioning Contractors' Nat'l Assoc.

D. All materials shall be new and shall bear the label of UL.

1.03 EXISTING CONDITIONS

A. Where work is to be performed in an existing facility, the contractor shall visit the site prior to bid and be familiar with all existing conditions. Special attention shall be given to work to be performed above an existing ceiling.

B. Where existing slabs are to be cut or core drilled, the contractor shall x-ray the existing slabs to avoid cutting or disrupting existing conduits, cables, plumbing or structural members.

C. HVAC systems, plumbing systems, and electrical service to the building shall not be interrupted without written consent of the building owner.

D. No allowance will be made for lack of knowledge of existing conditions.

E. At the completion of the project, all work under this Division shall be completely integrated with the existing systems and left in perfect operating condition.

F. Where work under this Division disrupts the continuity of any existing to remain electrical circuit or feeder, the Contractor shall repair/replace as necessary to return to a perfectly functional and safe operating condition.

G. Prior to any demolition or construction the Contractor shall have the existing conditions inspected by an EPA, OSHA certified asbestos abatement agency to identify the presence of asbestos. Should any asbestos be found it shall be

brought to the immediate attention of the Architect and Owner and specifically identified in writing.

1.04 DEFINITIONS

A. Provide: to furnish, install and connect.

B. Furnish: to supply all materials, labor, equipment, testing apparatus, controls, tests, accessories and all other items customarily required for the proper and complete application.

C. Install: to join, unite, fasten, link, attach, set-up or connect together, complete, tested, and ready for normal satisfactory operation.

D. Engineer: the Engineer of record.

E. Contract Documents: the complete set of Specifications and Drawings of all Divisions.

F. Work: labor, materials, equipment, accessories, controls and other items required for a complete installation.

G. Concealed: embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces or in enclosures.

H. Exposed: not installed underground or concealed.

I. Equal: equal in quality, workmanship, materials, weight, size, design and efficiency of the specified product, conforming with manufacturers.

J. Supply: to purchase, procure, acquire and deliver complete with related accessories.

K. Authority Having Jurisdiction (AHJ): applicable local, state and federal authorities having jurisdiction over any part of the Scope within this Division and other Divisions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer's names and catalog numbers specified in the Contract Documents are intended to describe the material and set the standard of quality. All bids shall be based on material specified. Request for approval of material not specified shall be considered if the request is in written form and submitted to the

Architect no later than fourteen (14) days prior to the bid date. All requests shall conform to the provisions of the general and supplementary conditions.

B. When specific names are not stated, only the best available quality of material or equipment shall be submitted for review and used in the installation.

2.02 BASIS OF DESIGN

A. Where a product is designated as "BASIS OF DESIGN", the Contractor is notified that mechanical, electrical, structural, architectural, space conditions and/or other features of the overall project design have been based on the requirements of the "BASIS OF DESIGN" product.

B. Where a product is substituted for a "BASIS OF DESIGN" product, the Contractor is notified that changes in project design may be mandatory in order to permit use and installation of the substitute product. Shop drawing submittal for a substitute product shall include a complete schedule of changes in project design, if any, which must be made in order to permit use and installation of the substitute product. The Contractor shall bear all expenses related to the use of a substitute product.

2.03 SHOP DRAWINGS AND PRODUCT DATA

A. The Contractor shall obtain complete shop drawings, product data and samples from the manufacturers, suppliers, vendors, and all Division 22 Subcontractors, for all materials and equipment as specified herein in various Sections of the Specifications, and shall submit data and details of such materials and equipment for review by the Architect and Engineer. Prior to submission of the shop drawings, product data and samples to the Architect and Engineer, the Contractor shall thoroughly review the shop drawings, product data and samples and certify they are in compliance with the Contract Drawings. Further, the Contractor shall check all materials and equipment upon their arrival on the Project site and verify their condition and compliance with the Contract Documents. Any Work which proceeds prior to receiving reviewed shop drawings shall be modified as required to comply with the Contract Documents and the shop drawings. A minimum period of ten (10) working days, exclusive of transmittal time, will be required in the Engineer’s office each time a shop drawing, product data and/or sample is submitted or resubmitted for review. This time period shall be considered by the Contractor when scheduling his Work. The initial shop drawing review for equipment and materials may be expedited through the mutual consent of the Contractor, Architect, Engineer, and Owner providing the Contractor agrees to submit complete, certified, documented, and coordinated shop drawings for review in accordance with the requirements of the Contract Documents.

B. The review of shop drawings, product data, and samples by the Architect and Engineer shall not relieve the Contractor of the responsibility for dimensions or errors that may be contained therein, or for deviations from requirements in the Contract Documents. It shall be clearly understood that the noting of some errors by the Engineer but overlooking others does not grant the Contractor permission to proceed in error.

C. All shop drawings and product data/submittals shall be submitted in compliance with the requirements of the general and supplementary conditions. No more than four (4) copies of submittal data will be reviewed. Any additional copies will be returned unmarked. The responsibility of copying review comments on any additional copies will rest solely with the Contractor.

D. All product data/submittals shall bear the name of the manufacturer to be used.

E. All shop drawings and submittals shall include a stamped indication signifying that the submittal has been reviewed for compliance with the Contract Documents by the Contractor. This stamped indication also represents the fact that the Contractor has checked this submittal for its interaction with all other Divisions and certifies by his signature or initials that all coordination has taken place. The stamp shall include the date, name of the Contracting Firm, the signature of the Contractor, certification of compliance and approval. This stamp shall be on the submittal before the Engineer will review it.

F. The Engineer will review an individual submittal not more than twice. If the submittal is rejected again on the second review, the Contractor will bare all responsibility for paying for the Engineer's time for additional reviews. Such payments to the Engineer shall be withheld from the next monthly pay application.

G. Shop drawings and/or product data shall be submitted for the following for review:
   1. Plumbing piping system layouts. These drawings must include associated equipment, drawn to scale based on submittals for that equipment, must be dimensioned, and must include piping and equipment elevation tags (distance above finished floor to bottom).
      The Contractor is encouraged to develop their own shop drawings, without having had the Engineer's CAD files (as previously stated, the Engineer's drawings are schematic/diagrammatic in nature). Should the Contractor insist on using the Engineer's CAD files in the procurement of shop drawings, the Contractor must pay the Engineer $150.00 per sheet for the CAD files.
      The Contractor shall give the Engineer a written release, acceptable to the Engineer, signed by a corporate officer of the Contractor. This release shall also include a copyright statement indicating that these drawings or electronic data contained will not be used on any other project. The release and payment for the files must be received PRIOR to delivery of the CAD files.
   2. Equipment, including but not limited to: water heaters, plumbing fixtures, booster systems, lift stations, heat tracing, insulation, piping specialties, etc.

2.04 AS-BUILT DRAWINGS

A. The Contractor shall maintain on a daily basis at the Project site a complete set of "Record Drawings". The "Record Drawings" shall consist of a set of black-line or blue-line prints or AutoCAD files of the Contractor Coordination Drawings for this Division. The prints shall be marked or the AutoCAD file electronically

updated to show the precise location of all work and equipment, and all changes and deviations in the work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite instructions from the Architect or Engineer. The continuously updated coordination drawings (shop drawings previously described) shall be used to produce the final "Record Drawings" which shall be delivered to the Owner in AutoCAD electronic format (CD) upon Project completion.

B. Record dimensions shall clearly and accurately delineate the work as installed; locations shall be suitably identified by at least two dimensions to permanent structures.

C. The Contractor and Subcontractor shall mark all "Record Drawings" on the drawings with a rubber stamp impression or an AutoCAD image that states such.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The equipment selections used in the preparation of the Contract Documents will fit into the physical spaces provided and indicated, allowing ample room for access, servicing, removal and replacement of parts, etc. Adequate space shall be allowed for clearance in accordance with the Code requirements and the requirements of the local Authorities having jurisdiction, and the equipment manufacturer‘s recommendations.

B. In the preparation of Drawings, a reasonable effort to accommodate acceptable equipment manufacturer's space requirements has been made. However, since space requirements and equipment arrangement vary according to each manufacturer, the responsibility for initial access, maintenance access, code required access, and proper fit rests with the Contractor.

C. Physical dimensions and arrangements of equipment to be installed shall be subject to the Architect's and Engineer's review.

D. The General Contractor and all Subcontractors shall coordinate the installation of ductwork, conduit, busway, piping, cable trays, etc., installation with lighting fixtures, special ceiling construction, air distribution equipment, and the structure. Provide additional rises, drops and offsets as required. If after installed, new ductwork, conduit, busway, piping or cable is found to be in conflict with the architecture, structure, or other trade Work which is either existing or shown on the Contract Documents, the ductwork, conduit, busway, piping or cable shall be relocated without additional cost to the Owner.

E. Accessibility and Clearance:
1. Piping, etc. shall be installed in accessible locations, avoiding obstructions, preserving headroom, and keeping openings and passageways clear.

2. Minor adjustments in the locations of equipment shall be made where necessary, providing such adjustments do not adversely affect functioning of the equipment.

F. Scaffolds and staging for installation of plumbing work shall be provided under the work of this Division.

3.02 STRUCTURAL FITTINGS

A. Furnish and install the necessary sleeves, inserts, hangers, anchor bolts, and related structural items. Install at the proper time.

B. Openings may have been indicated on the Architectural drawings. Should any additional openings or holes be required, the same shall be provided at no additional cost to the Owner.

C. Location: At a time in advance of the work, verify openings shown on the Architectural drawings, and coordinate any additional openings.

D. If the work of this Section requires modification of the Architectural drawings, furnish new instructions as to requirements for these openings. Submit for review and coordination to Architect.

E. Sleeves shall be supplied for mechanical piping passing through walls or slabs and shall be placed before concrete is poured.

F. Equipment supports for mechanical work shall be fastened to the structure by inserts, anchor bolts, bolting to drilled and tapped structural members, or be welded to the structure.
1. Welding shall be done by the electric arc method with fully competent welders. Supporting members shall be shop coated with a suitable primer.
2. Surfaces damaged by installation of supports shall be touched up with primer to match shop coat. Any drilling of structural members shall be approved by the Architect.

G. Flashing:
1. Wherever piping passes through the roof or outer walls, base flashing and counter-flashing shall be provided.
2. Such flashing shall be properly installed by skilled workmen, and shall include grouting, mastic or tar application, or other means to insure a permanent, waterproof, neat and workmanlike installation.
3. Insofar as possible, flashing shall comply with and be similar to requirements for flashing in General Construction Work.

H. Anchor bolts and inserts shall be galvanized and of adequate size and strength for installation of electrical work and shall be placed in forms before concrete is poured.
1. Placement of bolts in bases shall be done under other Division. Furnish detail drawings, templates, and anchor bolts for bases to the General Contractor in time to avoid delaying work schedules.

2. Expansion shields shall only be used with specific approval of the Architect. Wooden or soft metal plugs shall not be used.

I. Cutting and patching:
1. All additional cutting, patching and reinforcement of construction of building, subject to review by the Architect, shall be performed under this Section.
2. Refer to appropriate Division for requirements.

3.03 WEATHERPROOF EQUIPMENT

A. Plumbing devices or equipment located in damp, semi-exposed areas shall be weather-resistant. Enclosures shall comply with NEMA Type 3R requirements.

B. Air distribution devices located in damp areas outside shall be weather-resistant (aluminum, etc.).

3.04 CLEANING

A. Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.

B. Painted exposed work soiled or damaged: Clean and repair to match adjoining work before final acceptance.

C. Remove dust and debris from inside and outside of material and equipment.

3.05 TESTS AND DEMONSTRATIONS

A. All systems shall be tested in the presence of the Owner or an Owner designated representative upon completion of the Work and demonstrates that the installation is in accordance with the Contract Documents.

B. All motors shall be checked and adjusted for correct direction of rotation.

C. Any work found not to be in compliance with the Contract documents shall be repaired or replaced without incurring additional cost to the Contract price.

D. Provide all instruction to the Owner on maintenance and operation of all systems and equipment provided under this Division.

3.06 WARRANTIES

A. The warranty period for all systems, equipment, components, work, etc. shall be no less than one (1) year, unless specified otherwise hereinafter and shall include at least one (1) full heating season and one (1) full cooling season. The warranty shall include parts and labor.

B. The Contractor shall, without cost to the Owner, remedy any defects within a reasonable time to be specified in notice from the Architect. In default thereof, the Owner may have such work done and charge all costs to the Contractor.

C. The start of the Contractor's warranty period, as defined in the General Conditions, shall commence on the issue of a "Certificate of Substantial Completion", by the Owner or the Owner's Representative for each item of material, equipment or system.

D. The Subcontractor shall confer with the General Contractor prior to the bid date concerning the project schedule and determine if there is a need to operate any items of equipment or systems for temporary heating and/or cooling or other reasons prior to "Substantial Completion". All required extended warranty costs for equipment, materials, and systems shall be included in the Subcontractor's bid.

END OF SECTION

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SECTION 220529 HANGERS & SUPPORTS FOR PLUMBING

PIPING & EQUIPMENT

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The Conditions of the Contract and applicable requirements of Division 1, "General Requirements", and Section 22 01 00 "General Plumbing Requirements", govern this Section.

1.02 DESCRIPTION OF WORK

A. Work Included: Provide pipe hangers, supports, and required appurtenances as specified and indicated

1.03 QUALITY ASSURANCE

A. MSS Standard Compliance: Provide pipe hangers and supports of materials, design, and manufacture which comply with ANSI/MSS SP-58, SP-59, SP-89, and SP-90.

B. Acceptable Manufacturers: The model numbers listed in the Specification establish a level of quality and material. Subject to compliance with requirements, provide products and materials by the following:
   1. ITT Grinnell Corporation,
   2. Fee and Mason,
   3. Central Iron Manufacturing Company, and
   4. F& S Manufacturing Company
   5. Anvil International
   6. B-Line

PART 2 – PRODUCTS

2.01 PIPE HANGERS AND SUPPORTS:

A. General: Provide pipe hangers and supports as specified. Comply with local codes and standards for pipe and equipment support and anchorage. Pipe supports shall be of material that will prevent electrolytic action.

B. Inserts: Provide Grinnell No. 282 inserts for concrete construction.

C. Piping in Multiple Parallel Runs: Provide Grinnell No. 45 or No. 50 with Grinnell No. 137 U-bolt pipe clamps or structural channels or angles with U-bolt clamps, supported as trapeze hangers where multiple parallel runs of piping are shown. Select and size members for weights to be carried and span dimensions between supports.

D. Piping in Single Runs: Provide Fee and Mason Fig. 239 or Grinnell No. 260 clevis hanger.

E. Hanger Rod: Provide hanger rods of required length. Rod diameters shall be as listed in the following table. Rod diameters may be adjusted after consultation with the Structural Engineer concerning the building framing system, the method of attachment to the structure and the support rod spacing.

Pipe Sizes	Rod Diameter
3/4" - 2"	3/8"
2-1/2" – 3	1/2"
4" – 5	5/8"
6"	3/4"
8" – 12"	7/8"
14" – 18"	1"

F. Riser Clamps: Provide Fee and Mason Figure 241 riser clamps. Riser clamps for copper tube shall be copper-plated.

G. Saddles and Shields:
1. Saddles for Horizontal Insulated Piping without Vapor Barrier: At each hanger or support on horizontal runs, provide Grinnell No. 160 or Fee and Mason Figure 171, 1710, 1712, or 172 saddles, as applicable. Shields as described below may be used instead of the saddles. On heating water systems below 140ºF (60ºC), hangers may be sized for the pipe size and of a material compatible with the pipe. Where dissimilar materials are used, provide dielectric separation. Carry insulation over the hanger and seal where hanger is sized for pipe.
2. Shields for Horizontal Insulated Water Piping with Vapor Barrier: At each hanger or support for water piping, provide a half section of preformed 6 PCF density fiberglass or rigid calcium silicate, with jacket of adjacent insulation brought across unbroken, supported on semicircular 16 gauge shields. Shields for pipe 4" and smaller shall be 12" long; shields for pipe 5" to 8" shall be 18" long; and shields for larger pipe shall be 24" long.

PART 3 – EXECUTION

3.01 INSTALLATION:

A. Independent Support: Support fire sprinkler piping independently of other piping in accordance with NFPA-approved methods and local codes and standards.

B. Provisions for Movement:
3. Movement: Install hangers and supports to allow controlled movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate the action of expansion joints, expansion loops, expansion bends, and similar units.
4. Load Distribution: Install hangers and supports so piping live and dead loading stresses from movement will not be transmitted to any pipe or connected

equipment. Pipe supports shall properly transmit the weight of the pipe and its contents to the building structure, or to independent posts, piers, or foundations.

5. Pipe Slopes: Install hangers and supports to provide the indicated pipe slopes so maximum pipe deflections allowed by ANSI B31 are not exceeded.

C. Insulated Piping: Comply with the following installation requirements:
   1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through the insulation; do not exceed pipe stresses allowed by ANSI B31.
   2. Shields: Where low-compressive-strength insulation of vapor barriers are indicated on cold, chilled, or heating water piping, install coated protective shields. For pipe 8" and over, install rigid calcium silicate insulation between saddles and pipe.

D. Spacing: Install hangers and supports in piping systems to remove stress from equipment flanges and rotating equipment. Space hangers and supports as shown in the following table. Rod spacing may be adjusted after consultation with the Structural Engineer concerning the building framing system, the method of attachment to the structure and the support rod diameters.

Trade Pipe Size	Maximum Spacing
1/2"	5'
3/4"	6'
1" and 1-1/4"	7'
1-1/2"	9'
2"	10'
2-1/2"	11'
3"	12'
4"	14'
5"	16'
6"	17'
8"	19'
10"	22'
12"	23'
14"	25'
16"	27'
18"	28'

E. Saddles: Where insulation without vapor barrier is indicated, install protection saddles, or use hangers as indicated in Paragraph 2.0/G.1.

F. Guides: Install pipe guides complying with the manufacturer's published product literature. Where not otherwise indicated, install pipe guides near expansion loops, expansion joints, and ball joints.

G. Anchors: Install anchors at the proper locations to prevent stresses from exceeding those permitted by ANSI B31 and to prevent the transfer of loading and stresses to connected equipment. Anchors shall include vibration isolation in accordance with the pipe support system specified. Where the piping system is floating, the anchors shall be termed restraints or braces.

1. Where expansion compensators are indicated, install anchors in accordance with the expansion unit manufacturers written instructions, to limit movement of piping and forces to the maximums recommended by the manufacturer of each unit.
2. Where not otherwise indicated, install anchors at the ends of principal pipe runs and at intermediate points in pipe runs between expansion loops and bends. Make provisions for preset of anchors as required accommodating both expansion and contraction of piping.

H. Leveling: Adjust hangers and supports and place grout as required under supports to bring piping to proper levels and elevations.

I. Hangers: Pipe hangers made of wood, wire, or sheet iron shall not be permitted.

J. Riser Supports: Vertical piping shall be secured at sufficiently close intervals to keep the pipe in alignment and carry the weight of the pipe and contents.
1. Cast iron soil pipe shall be supported at the base and at each story level, but in no case at intervals greater than 10’.
2. Steel pipe shall be supported at the base and at no less than every other story level, but in no case at intervals greater than 25’.
3. Copper tube shall be supported at each story level, but in no case at intervals greater than 10’.
4. Plastic pipe shall be supported at midpoint between floors and at ceiling to prevent movement, but in no case at intervals greater than 8’.

END OF SECTION

SECTION 220553 IDENTIFICATION FOR PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 22 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the identification of equipment and piping. Comply with other Division 22 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the identification of equipment and piping specified herein and/or as indicated on the drawings.

1.02 DESCRIPTION OF WORK

A. Work Included: Identification of plumbing equipment shall consist of equipment labeling, pipe marking, and valve tagging as specified hereinafter.
   1. In general, all equipment shall be labeled.
   2. Pipe markings shall be applied to all piping.
   3. Each valve shall be identified with a stamped tag. Valves and tagging shall be scheduled typewritten on 8 ½" x 11" paper, tabulating valve number, piping system, system abbreviation, location of valve (Room or area), and service (e.g. – 2nd Floor North Domestic Hot Water). The valve schedule shall be submitted to the Engineer for approval prior to ordering or installing valve tags. See Section 23 01 00, "General Mechanical Requirements" for information and requirements regarding Operation and Maintenance Manuals.
   4. Labels, tags, and markers shall comply with ANSI A13.1 and other applicable state and local standards for lettering size, colors, and length of color field.
   5. Equipment and device identification specified in other sections shall be provided as a part of those requirements.

1.03 ACCEPTABLE MANUFACTURERS

A. Labels, markings, and tags shall be manufactured by W.H. Brady, Seton, Allen, or Industrial Safety Supply.

PART 2 - PRODUCTS

2.01 EQUIPMENT LABELING

A. Equipment labeling shall be provided with plastic (Bakelite) 4" x 6" nameplates. Nameplates shall be black with white letters.

2.02 PIPE MARKINGS

A. Pipe markers shall be pressure-sensitive type. Provide manufacturer's standard preprinted, permanent adhesive, color-coded pressure sensitive vinyl labels complying with ANSI A13.1. Color-coded plastic adhesive flow directional arrow tape, full circle at both ends of the pipe marker, tape overlapped 1-1/2". Use 1" tape for piping less than 2-1/2", 2" tape for 2-1/2" through 8" piping, and 4" tape for larger piping. Comply with ANSI A13.1 for piping system nomenclature. Abbreviate only as necessary to accommodate marker length.

2.03 VALVE TAGS

A. Valve tags shall be 1/16" polished brass, 1-1/2" square, with solid brass S hook and chain. Tags shall be engraved with the appropriate abbreviation for the type of service (e.g. – CHW, HW), as well as the designated valve number.

B. A valve schedule is to be provided to the Owner. For each page of valve schedules, a glazed display frame, with screws for removable mounting on masonry walls. Provide frames of finished hardwood or extruded aluminum, with SSB-grade sheet glass.

PART 3 - EXECUTION

3.01 GENERAL

A. Identification labeling, marking, and tagging shall be applied after insulation and painting has been completed.

B. Coordinate names, abbreviations, and other designations used in mechanical identification work with corresponding designations shown, specified, or scheduled on drawings. Prior to ordering any labels, markings, or tags, obtain the approval of the Engineer regarding names, abbreviations, etc.

C. The Plumbing, HVAC, and Fire Protection Contractors shall coordinate labeling, marking, and tagging to ensure consistent and coordinated identification. In existing buildings, utilize similar names, abbreviations, and other designations that are currently in use to remain consistent with existing identification.

D. Equipment labeling shall consist of unit designation as shown on the drawings.

E. Pipe markers shall be placed on piping on 25' centers in mechanical rooms and concealed spaces. In locations where piping is exposed, place markers on 50' centers. Flow directional arrows should be marked on the piping at taps from the main and riser.

F. Valve tags shall be placed on each valve except those intended for isolation of individual equipment. Valve tag schedules shall be prepared as specified hereinbefore. Copies of one schedule shall be laminated in clear plastic and placed where directed by the Owner. Other sets shall be included in the Operating and Maintenance Manuals.

END OF SECTION

SECTION 220700 PLUMBING INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 22 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the insulation of Plumbing piping and equipment. Comply with other Division 22 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the insulation system specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

1.02 QUALITY ASSURANCE

A. Manufacturer: Approved manufacturers are Armstrong, Calsite, Cell-U-Foarm Corp, Ceelco, Certainteed Corp, Dow Chemical Company, Forrest Mfg Co, Foster / Chilers, Gemco, Johns Manville, Knauf Fiberglass, Midwest Fastners, Owens Corning Fiberglass, Pittsburg Corning Fiberglass, Rubatex, Trymer, and Venture Tape.

B. All insulation, jacket and adhesive shall have a fire and smoke hazard ratings as tested under ASTM E 84, NFPA 255, and UL 723 not exceeding:

Flame Spread:	25
Fuel Contributed:	50
Smoke Developed:	50

Exceptions: Type B Insulation and PVC Fitting Covers

1.03 SUBMITTALS

A. Per Section 22 01 00.

B. Product Data
1. Type A Insulation
2. Type B Insulation
3. Type C Insulation
4. Type D Insulation
5. Type E Insulation
6. Type F Insulation
7. Type G Insulation
8. Vinyl Lacquer Paint for Type B Insulation
9. Metal Jacket

1.04 DEFINITIONS

A. The phrase "Storm Drainage Conductor" refers to that portion of the storm drain interior to the building, between the roof drain body and where the pipe goes below grade.

B. The word “plenum” shall mean a ceiling space or mechanical room used for the transfer of conditioned return and/or outside air.

PART 2 - PRODUCTS

2.01 PIPING INSULATION

A. Type A – Fiberglass (indoor)
1. One Piece glass fiber, rigid molded sectional pipe covering with factory applied aluminum foil and white craft paper flame retardant vapor barrier jacket, conforming to ASTM C547, Class II, Mineral Fiber Preformed Pipe Insulation.
2. Thermal Conductivity (k) equals approximately 0.23 (BTU/HR., SF., Degree F, IN) at 75 °F.
3. Similar to Johns Manville Corp “Micro Lox 650 AP T”, or approved equal.

2.02 INSULATION ACCESSORIES

A. The following accessories shall be used in the application of the thermal insulations specified under this Section:
1. PVC Fittings Covers: similar to Johns Manville Corp “Zeston”, or approved equal.
2. Pressure Sensitive polyester film tape to secure pipe insulation up to 12” outside diameter: Similar to 3M 30-80, or approved equal.
3. Vapor Seal Mastic: Similar to Childers CP-35, or approved equal.
4. Lagging Adhesive: Similar to Childers CP-52, or approved equal.
5. Wire: 16 gauge soft stainless steel.
6. Insulation Bonding Adhesive (To Metal): Similar to Childers CP-82, or approved equal.
7. Insulating and Finishing Cement: Similar to Insulco Smooth Kote, or approved equal.
8. Mechanical Fasteners - Welded or adhered pins with speed clip washers: Similar to Gemco Midwest Fasteners, or approved equal.
9. Bands for Equipment:
   a. Outside diameter of insulation is less than 24 inch: 1/2 inch x 0.020-inch (25 ga.) stainless steel.
   b. Where diameter is 36 inches or larger: 3/4 inch x 0.020 inch.
10. Bands for Piping: 1/2 inch x 0.020-inch stainless steel.
11. Wire Mesh: 1 inch by 20-gage stainless steel hexagonal wire netting.

PART 3 - EXECUTION

3.01 INSULATION APPLICABILITY

A. Domestic Cold Water – Type A insulation required:

Insulation Thickness (in)	Pipe Sizes (in)
1	all

B. Domestic Hot Water and Tempered Water – Type A insulation required:

Insulation Thickness (in)	Pipe Sizes (in)
1	all

Notes:

a. The above thicknesses are the minimum required. All local codes and local energy codes shall be complied with.

b. Insulation types and thickness are a minimum standard. Each application shall be carefully considered and insulation product type and thickness shall be appropriate for each specific application. Submit all insulation products with verification of their service intent.

3.02 PIPING INSULATION GENERAL REQUIREMENTS

A. Preparation

1. Do not apply insulation until piping has been leak tested.
2. All surfaces to be insulated shall be dry and free of loose scale, rust, dirt, oil or water.

B. Application:

1. Insulation shall be installed in a smooth, clean workmanlike manner. Joints shall be tight and finished smooth without fish-mouths.
2. Insulation shall fit tightly against the surface to which it is applied to prevent air circulation between the insulation and the pipe or equipment to which it is applied.
3. Insulation applied to cold piping or equipment shall be completely vapor sealed, free of pinholes or other openings.
4. Do not use wet insulation materials.
5. All longitudinal joints on vertical pipe runs shall be staggered.
6. Apply insulation so as to permit expansion or contraction of pipelines without causing damage to insulation or surface finish.
7. Do not apply mastic or adhesive until all previous applications of mastic and adhesives have thoroughly dried.
8. No bands or staples shall be provided on covering.
9. The adhesive used in connection with all covering work shall contain an approved vermin and rodent proof ingredient.
10. Provide 24-gauge sheet-metal saddle between the pipe hanger/support and the exterior of the insulation. Saddle length shall be the same as insulation inserts.

C. Application at Fittings:

1. Insulation of flanges and flanged fittings shall overlap adjacent pipe covering at least 1 inch. Valves shall be insulated up to the gland only.
2. Pipeline strainers shall be insulated in such a manner as to permit removal of strainer basket without disturbing insulation of the strainer body.
3. Insulation adjacent to un-insulated flanges shall be tapered back and neatly finished so as to allow access to and removal of bolts without injury to covering.

3.03 TYPE A INSTALLATION

A. Tightly butt together sections of insulation on pipe runs sealing longitudinal seams of jacket with a self-sealing adhesive. Seal end joints with 4-inch wide straps of matching vapor barrier tape. Seal off ends of insulation with vapor seal mastic at valves, fittings and flanges. No further finish required. Mastic shall extend onto the bare pipe and over the insulation O.D.

B. PVC fitting jackets shall be used when they are available for the particular application. When molded or routed coverings are not available, the coverings shall be fabricated in the field similar to equipment insulation. Molded or routed fitting covers are highly recommended. Order PVC pre-curled.

C. Cold Piping:
1. Cover valves, fittings and flanges with insulation having the same thickness as adjacent pipe covering, securing in place reforming tape up to 12” O.D. and ½” wide SST bands on larger O.D. Apply a PVC jacket and seal joints with PVC cement (solvent welding).

D. Hot Piping:
1. Covers shall overlap the pipe insulation by the thickness of the insulation or 2” min. Cover valves, fittings and flanges with insulation similar to the adjacent pipe covering, securing in place with reforming tape up to 12” O.D. and ½” wide SST bands on larger O.D. Apply a PVC jacket and tape end joints to adjacent pipe insulation.
2. Do not use PVC fitting jackets where the surface of the insulation is above 150 degrees F.

3.04 HANGERS

A. Continue insulation through pipe hangers. Provide either rigid insulation inserts or sheet metal inserts at all outside pipe hangers. Provide rigid insulation inserts for piping operating below 60 °F. and sheet metal inserts for piping above 60 °F.

B. Provide rigid insulation (on non-insulated piping) or sheet metal inserts (on insulated piping) between the pipe and pipe hanger - shall be of a thickness equal to the adjoining insulation and shall be provided with vapor barrier where required. Insulation insert shall not be less than the following lengths:

1/2” to 2 1/2" pipe size	10 Inches Long
3” to 6" pipe size	12 Inches Long

C. Inserts for cold piping shall have a vapor barrier facing of the same material as the adjacent pipe insulation. Seal inserts into insulation with vapor seal mastic.

D. Sheet metal inserts shall be of steel sheet. Gauge shall conform to manufacturer's recommendation for pipe size. Sheet metal inserts shall have insulation filler of the same material as the adjacent pipe insulation.

3.05 PIPE SLEEVES

A. Pipe insulation and vapor barrier shall be continuous through sleeves in walls and floors.

B. Type B insulation shall not be used in sleeves through firewalls or fire rated (2-hour) floor systems. Use Type A or Type C through the sleeve instead and vapor seal the joint between the two insulations.

C. Provide 26 gauge galvanized steel or 0.020 inch aluminum jacket over insulation on pipe passing through sleeves where sealant is required.

D. Where penetrating interior walls, extend the metal jacket 2 inches out either side of the wall and secure each end with a metal band compressing the insulation slightly.

E. Where penetrating floors, extend the metal jacket 2 inches below the floor and 5 inches above the floor. Secure with metal bands.

END OF SECTION

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SECTION 221000 PLUMBING PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 22 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the plumbing piping systems. Comply with other Division 22 and 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the plumbing piping systems specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

1.02 DESCRIPTION OF WORK

A. Work Included: Provide complete operating plumbing piping systems including pipe, tube, fittings, and appurtenances as indicated and in compliance with these Specifications.

B. Applications: Applications of piping systems include, but are not limited to, the systems as listed below:

Working System	Operating Pressure	Temperatures
Domestic Cold Water		
High	350 psig	55 to 80°F
Medium	300 psig	55 to 80°F
Low	150 psig	55 to 80°F
Domestic Hot Water		
High	350 psig	90 to 120°F
Medium	300 psig	90 to 120°F
Low	150 psig	90 to 120°F
Sanitary Drainage	--	--

1.03 QUALITY ASSURANCE

A. Welding: Qualify welding procedures, welders, and operators in accordance with ANSI B31.1, Paragraph 127.5, for shop and job site welding of piping work. Make welded joints on the piping system with continuous welds, without backing rings and with pipe ends beveled before welding. Gas cuts shall be true and free

from burned metal. Before welding, surfaces shall be thoroughly cleaned. The piping shall be carefully aligned and no weld metal shall project inside the pipe.

PART 2 - PRODUCTS

2.01 PIPING MATERIALS

A. General: Provide pipe and tube of type, joint, grade, size, and weight (wall thickness, schedule or class) indicated for each service. Comply with applicable governing regulations and industry standards.
1. Copper Tube: ASTM B88, Types "K", Type "L", or Type "M" copper water tube as defined by the Copper and Brass Research Association.
2. Hubless Cast Iron Pipe: CISPI 301-78, standard weight with spigot bead ends for coupling assembly.

2.02 PIPE / TUBE FITTINGS

A. General: Provide factory-fabricated fittings of type, materials, grade, class, and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve, and equipment connections. Where not otherwise indicated, comply with governing regulations, industry standards, and where applicable, with pipe manufacturer's instructions for selections.
1. Cast Iron Drainage Fittings: ANSI B16.22 galvanized with pitched threaded ends.
2. Pipe Nipples: Fabricated from same pipe as used for connected pipe, except do not use less than Schedule 80 pipe where length remaining unthreaded is less than 1/2". Do not thread nipples full length (no all-thread nipples).
3. Wrought Copper/Bronze Solder-Joint Fittings: ANSI B16.22 suitable for working pressure up to 250 psig.
4. Hub-less Cast Iron Pipe Fittings: CISPI 301-78 and comply with governing regulations.
5. Cast Iron Soil Pipe Fittings: ASTM A74.
6. Compression Gaskets: CISPI HSN-75.

B. Miscellaneous Piping Materials/Products:
1. Welding Materials: Comply with ASME Boiler and Pressure Vessels Code, Section II, Part C, for welding materials.
2. Brazing Materials: American Welding Society, AWS A5.B, Classification BCup-5.
3. Insulating (Dielectric) Unions: Provide dielectric unions at all pipe connections between ferrous and nonferrous piping. Unions shall be "Delvin" as made by Pipeline Seal and Insulator Company or "EPCO" as made by Epco Sales, Inc. and shall have nylon insulation or equal.
4. Gaskets for Cast Iron Soil Pipe: ASTM C 564, neoprene, compression-type.
5. Push-on-Joints: ANSI A21.11, rubber compression-type, "Tyton Joint" as manufactured by US Pipe or equal.
6. Hub-less Cast Iron Joints: CISPI 310, stainless steel corrugated shield and clamp assembly over one piece neoprene sealing sleeve.

PART 3 - EXECUTION

3.01 PIPING INSTALLATION

A. General:
1. Industry Practices: Install pipe, tube, and fittings in accordance with recognized industry practices which will achieve permanently leak-proof piping systems, capable of performing each indicated service without failure or degradation of service. Install each run with a minimum of joints and couplings, but with adequate and accessible unions or flanged connections to permit disassembly for maintenance/ replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings. Align accurately at connections. Coordinate piping locations with other trades to avoid conflict. Give ductwork preference unless directed otherwise by the Engineer.
2. Systems: Install piping parallel or perpendicular to lines of building, true to line and grade, and with sufficient hangers to prevent sags between hangers. Provide fittings at changes in direction. Piping in finished areas shall be concealed, except in mechanical rooms. Where pipes of different sizes join, provide reducing elbows, tees, or couplings. Bushings will not be acceptable.
3. Expansion and Contraction: Install loops, offsets, sizing joints, and expansion joints, as necessary, to avoid strain resulting from expansion and contraction of piping systems on fixtures and equipment. Provide mechanical grooved connections required by the application to reduce vibration at equipment connections. Provide expansion joints in piping systems by mechanical grooved connections where required.

B. Copper Pipe: Cut copper pipe square and ream to remove burrs. Clean fitting socket and pipe ends with sand cloth or wire brush.

C. Final Connections to Equipment Furnished by Owner or Under Other Divisions of These Specifications: Where equipment is to be furnished under other Divisions of these Specifications or by the Owner, such equipment will be delivered to the site, uncrated, assembled, and set in-place under those other Divisions of these Specifications or under the separate contracts. Any required automatic control valves shall also be provided under those other Divisions of these Specifications or other separate contracts. Make all final connections of hot water, condenser water, gas, domestic water, waste, and vent as required. Provide valves, unions, strainers, check valves, and traps as required for proper operation of systems and equipment. Equipment not shown on the Architectural Drawings or noted by the Architect and/or Engineer shall not be included in the scope of this requirement.

3.02 DOMESTIC HOT AND COLD WATER PIPING SYSTEMS

A. Interior Hot and Cold Water Piping:

1. Type "L" hard drawn copper tubing. Joints for pipe sizes 2-1/2" and smaller shall be soldered using 95/5 lead free solder. Joints for pipe sizes 3" and larger shall be brazed.
2. Provide isolation fitting whenever dissimilar materials are used.
3. Piping Run-outs to Fixtures: Provide piping run-outs to fixtures sized to comply with governing regulations. Each fixture shall be provided with a shut-off valve for each supply line. Provide all shutoff valves necessary to isolate mains to each restroom. Exposed lines shall be chromium-plated.

B. Air Chambers: Provide the necessary air chambers, shock absorbers, or water hammer arrestors, specifically sized for the application to prevent water hammer.
1. All water hammer arrestors shall be PDI certified, size A, B, C, D, E, F, as indicated and/or as appropriate for the fixtures served. Josam, Zurn, or Jay R. Smith.
2. Water hammer arrestors shall be installed at the top of each riser, and on each fixture branch, with quick closing valves, in accordance with Plumbing and Drainage Institute Standard WH201.

3.03 SANITARY DRAINAGE PIPING SYSTEMS

A. Soil, Waste, and Vent Piping Above Ground: Service weight cast iron soil pipe and fittings with neoprene gasket joints or hub-less cast iron pipe and fittings with coupling assembly.

B. Cleanouts:
1. General: Care shall be used when locating cleanouts. Wherever possible, do not place cleanouts in "finished" areas. All locations shall be approved by the Architect.
2. Finished Floor: Jay R. Smith No. 4434, cast iron adjustable assembly with nickel bronze cover and tapered thread bronze plug. Provide clamping collar when installed in floors having waterproof membrane.
3. Unfinished Areas: Jay R. Smith No. 4434 cleanout with cadmium-plated, cast iron plug.
4. Walls: Jay R. Smith No. 4434, cast iron with nickel bronze, square, smooth, access cover, vandal-proof screws.
5. Locations:
   a. At base of every drainage stack
   b. Maximum distance between cleanouts is 90 feet.
   c. At turns greater than 45 degrees.
   d. Other locations required by local code.

3.04 CLEANING, FLUSHING, TESTING, AND INSPECTING

A. Cleaning: Clean exterior surfaces of installed piping systems and prepare surface for application of any required coatings.

B. Flushing: Flush piping systems with clean water prior to performing any required tests.

C. Piping Tests:

1. General: Blank off equipment during tests. Perform tests before piping is enclosed in walls, floors, partitions or in any other way concealed from view. Tests may be performed in sections. Tests shall be witnessed by the General Contractor and local inspectors and the test results presented to the Engineer for acceptance and approval prior to concealing piping from view. Provide all necessary equipment for testing, including pumps and gauges. Note: All test results are to be submitted to the Engineer as specified in Section 22 01 00.
2. Domestic Water Systems: Test hot and cold water systems hydrostatically to a pressure of 150 psig or 1-1/2 times working pressure, whichever is greater, for a period of 4 hours. Repair all leaks, replacing materials as necessary, and repeat tests until systems are proven tight.
3. Soil, Waste, and Vent Piping System: Test soil, waste, and vent piping by plugging all openings and filling system to height required by City Plumbing Inspector, but not less than 10', except the top floor. Inspect all joints for leaks, repair all leaks found, and retest until piping is demonstrated to be free from leaks. In addition to water test, apply peppermint or smoke tests, if required by local code. All underground main piping shall be inspected with a camera and the taped test results submitted to the Owner. Provide test tees throughout the system to test the system in sections if plastic piping is used above grade.
4. Disinfecting of Water Systems: Disinfect as required by code. Where code does not dictate tests to be conducted, at a minimum disinfect the hot and cold water systems as follows: Fill systems with water solution containing 50 ppm available chlorine; allow to stand for 4 hours, opening and closing all valves several times during this period; thoroughly flush; refill and place system in service; ensure a chlorine content of 2.5 ppm.
5. Cleaning and Adjusting: Thoroughly clean and disinfect all plumbing fixtures, including all exposed trim. Adjust all flush valves for proper flushing, but without excess use of water.

D. Inspecting: Visually inspect each run of each system for completion of joints, adequate hangers, supports, and inclusion of accessories.

END OF SECTION

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SECTION 224000 PLUMBING FIXTURES

PART 1 - GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 22 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the plumbing fixtures. Comply with other Division 22 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the plumbing fixtures specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

1.02 DESCRIPTION OF WORK

A. Acceptable Manufacturers: The model numbers listed in the Specifications establish a level of quality and material. The following manufacturers are acceptable subject to compliance with the requirements of these Specifications.
   1. Stainless Steel Sinks
      a. Elkay Mfg. Company
      b. Just Mfg. Company
      c. Moen Incorporated

PART 2 - PRODUCTS

See drawings for Fixture Schedule. If fixture schedule contains unique fixture brand not listed within the specifications, the fixture schedule shall take precedence.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Heights: Set fixtures at heights as shown on the Architect's Drawings.

B. Caulking: This Contractor shall caulk the joint between the finished wall surface and all plumbing fixtures. Verify colors with the Architect. Caulking material shall comply with the appropriate section of these Specifications.

C. Each fixture shall be provided with a shut-off valve for each supply line. All exposed lines shall be chromium-plated.

END OF SECTION

SECTION 230100 GENERAL MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Division 23 includes Division 23 01 00 of the Specifications and Mechanical Drawings (HVAC). Elements of the Scope of Work include, but are not limited to, labor, materials, equipment, supplies, storage, transportation and all required permits, fees and licenses. Division 23 does not stand alone, but is part of the complete project and its Documents. Requirements of the General Conditions and Division 1 apply to all work in the Division.

B. Provide the necessary interface with other Divisions to provide a complete project. Carefully check the Documents of this Division with those Documents of other Divisions. Determine the requirements of any interfacing materials or equipment being furnished and/or installed by those Sections and Divisions, and provide proper installation and required interface.

C. No deviation from the Contract Documents shall be made without the written consent of the Architect and Engineer.

D. All Specifications and Drawings are to be considered together as the Contract Documents. Any work shown in one and not the other, or is implied by either, shall be provided to make a complete project. Should conflicts exist between the Specifications and Drawings or there is an item shown or noted for which is not clearly defined, immediately submit a request for clarification. Under no circumstance will conflicts between the Specifications and Drawings be grounds for additional cost to the Contract after the Contract is established.

E. The Drawings are schematic and are not intended to show the exact location of duct, piping, equipment, etc.

F. Dimensions and information regarding accurate locations of equipment, and structural limitations and finish shall be coordinated and verified with other Divisions of Work. Be prepared to furnish dimensions and information regarding the Work of this Division to other trades.

G. The right is reserved to relocate any device (receptacle, switch, fire alarm, audio/visual, junction box, outlet, etc.) a maximum of 10’-0” before it is permanently installed without incurring additional cost to the Contract.

1.02 REFERENCE STANDARDS

A. All work shall comply with the most recently revised versions of all local, state and federal codes, ordinances of the authority having jurisdiction, laws, rules and regulations. Any modifications required by any of the above shall be made without any additional cost to the Owner. Where requirements between governing Codes and Regulations vary, the more restrictive provision shall apply.

B. Nothing contained in the Contract Documents shall be construed as authority or permission to disregard legal requirements and regulations. The Contractor shall thoroughly review the Documents and bring any such conflicts to the attention of the Architect and Engineer prior to Installation.

C. All materials, installation, and workmanship shall comply standards and/or codes of the following:
1. International Building Code – 2006 edition, with latest Georgia amendments
2. International Mechanical Code - 2012 edition, with latest Georgia amendments
3. International Plumbing Code - 2012 edition, with latest Georgia amendments
4. International Gas Code - 2012 edition, with latest Georgia amendments
5. International Fire Code - 2012 edition, with latest Georgia amendments
6. International Energy Conservation Code - 2009 edition, with latest Georgia amendments
7. National Electrical Code, 2017 edition
8. National Fire Protection Association
9. State of Georgia (ANSI 117.1) Handicap Code
10. ANSI - American National Standards Institute
11. ASTM - American Society of Testing and Materials
12. NEMA - National Electrical Manufacturer's Association
13. OSHA - Occupational Safety and Health Act
14. UL - Underwriter's Laboratories
15. ASHRAE - American Society of Heating and Air Conditioning Engineers
16. SMACNA - Sheet Metal and Air Conditioning Contractors' Nat'l Assoc.

D. All materials shall be new and shall bear the label of UL.

1.03 EXISTING CONDITIONS

A. Where work is to be performed in an existing facility, the contractor shall visit the site prior to bid and be familiar with all existing conditions. Special attention shall be given to work to be performed above an existing ceiling.

B. Where existing slabs are to be cut or core drilled, the contractor shall x-ray the existing slabs to avoid cutting or disrupting existing conduits, cables, plumbing or structural members.

C. HVAC systems, plumbing systems, and electrical service to the building shall not be interrupted without written consent of the building owner.

D. No allowance will be made for lack of knowledge of existing conditions.

E. At the completion of the project, all work under this Division shall be completely integrated with the existing systems and left in perfect operating condition.

F. Where work under this Division disrupts the continuity of any existing to remain electrical circuit or feeder, the Contractor shall repair/replace as necessary to return to a perfectly functional and safe operating condition.

G. Prior to any demolition or construction the Contractor shall have the existing conditions inspected by an EPA, OSHA certified asbestos abatement agency to identify the presence of asbestos. Should any asbestos be found it shall be brought to the immediate attention of the Architect and Owner and specifically identified in writing.

1.04 DEFINITIONS

A. Provide: to furnish, install and connect.

B. Furnish: to supply all materials, labor, equipment, testing apparatus, controls, tests, accessories and all other items customarily required for the proper and complete application.

C. Install: to join, unite, fasten, link, attach, set-up or connect together, complete, tested, and ready for normal satisfactory operation.

D. Engineer: the Engineer of record.

E. Contract Documents: the complete set of Specifications and Drawings of all Divisions.

F. Work: labor, materials, equipment, accessories, controls and other items required for a complete installation.

G. Concealed: embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces or in enclosures.

H. Exposed: not installed underground or concealed.

I. Equal: equal in quality, workmanship, materials, weight, size, design and efficiency of the specified product, conforming with manufacturers.

J. Supply: to purchase, procure, acquire and deliver complete with related accessories.

K. Authority Having Jurisdiction (AHJ): applicable local, state and federal authorities having jurisdiction over any part of the Scope within this Division and other Divisions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer's names and catalog numbers specified in the Contract Documents are intended to describe the material and set the standard of quality. All bids shall be based on material specified. Request for approval of material not specified shall be considered if the request is in written form and submitted to the Architect no later than fourteen (14) days prior to the bid date. All requests shall conform to the provisions of the general and supplementary conditions.

B. When specific names are not stated, only the best available quality of material or equipment shall be submitted for review and used in the installation.

2.02 BASIS OF DESIGN

A. Where a product is designated as "BASIS OF DESIGN", the Contractor is notified that mechanical, electrical, structural, architectural, space conditions and/or other features of the overall project design have been based on the requirements of the "BASIS OF DESIGN" product.

B. Where a product is substituted for a "BASIS OF DESIGN" product, the Contractor shall notify the design team that changes in project design may be mandatory in order to permit use and installation of the substitute product. Shop drawing submittal for a substitute product shall include a complete schedule of changes in project design, if any, which must be made in order to permit use and installation of the substitute product. The Contractor shall be responsible for the coordination of all trades for use of the substituted product. The Contractor shall bear all expenses related to the use of a substitute product.

2.03 SHOP DRAWINGS AND PRODUCT DATA

A. The Contractor shall obtain complete shop drawings, product data and samples from the manufacturers, suppliers, vendors, and all Division 23 Subcontractors, for all materials and equipment as specified herein in various Sections of the Specifications, and shall submit data and details of such materials and equipment for review by the Architect and Engineer. Prior to submission of the shop drawings, product data and samples to the Architect and Engineer, the Contractor shall thoroughly review the shop drawings, product data and samples and certify they are in compliance with the Contract Drawings. Further, the Contractor shall check all materials and equipment upon their arrival on the Project site and verify their condition and compliance with the Contract Documents. Any Work which proceeds prior to receiving reviewed shop drawings shall be modified as required to comply with the Contract Documents and the shop drawings. A minimum period of ten (10) working days, exclusive of transmittal time, will be required in the Engineer's office each time a shop drawing, product data and/or sample is submitted or resubmitted for review. This time period shall be considered by the Contractor when scheduling his Work. The initial shop drawing review for equipment and materials may be expedited through the mutual consent of the Contractor, Architect, Engineer, and Owner providing the Contractor agrees to submit complete, certified, documented, and coordinated shop drawings for review in accordance with the requirements of the Contract Documents.

B. The review of shop drawings, product data, and samples by the Architect and Engineer shall not relieve the Contractor of the responsibility for dimensions or

errors that may be contained therein, or for deviations from requirements in the Contract Documents. It shall be clearly understood that the noting of some errors by the Engineer but overlooking others does not grant the Contractor permission to proceed in error.

C. All shop drawings and product data/submittals shall be submitted in compliance with the requirements of the general and supplementary conditions. No more than four (4) copies of submittal data will be reviewed. Any additional copies will be returned unmarked. The responsibility of copying review comments on any additional copies will rest solely with the Contractor.

D. All product data/submittals shall bear the name of the manufacturer to be used.

E. All shop drawings and submittals shall include a stamped indication signifying that the submittal has been reviewed for compliance with the Contract Documents by the Contractor. This stamped indication also represents the fact that the Contractor has checked this submittal for its interaction with all other Divisions and certifies by his signature or initials that all coordination has taken place. The stamp shall include the date, name of the Contracting Firm, the signature of the Contractor, certification of compliance and approval. This stamp shall be on the submittal before the Engineer will review it.

F. The Engineer will review an individual submittal not more than twice. If the submittal is rejected again on the second review, the Contractor will bare all responsibility for paying for the Engineer's time for additional reviews. Such payments to the Engineer shall be withheld from the next monthly pay application.

G. Shop drawings and/or product data shall be submitted for the following for review:

1. HVAC duct system layouts, including supply air and return air. These drawings must include associated equipment, drawn to scale based on submittals for that equipment, must be dimensioned, and must include duct and equipment elevation tags (distance above finished floor to bottom).
   The Contractor is encouraged to develop their own shop drawings, without having have had the Engineer's CAD files (as previously stated, the Engineer's drawings are schematic/diagrammatic in nature). Should the Contractor insist on using the Engineer's CAD files in the procurement of shop drawings, the Contractor must pay the Engineer $ 150.00 per sheet for the CAD files.
   The Contractor shall give the Engineer a written release, acceptable to the Engineer, signed by a corporate officer of the Contractor. This release shall also include a copyright statement indicating that these drawings or electronic data contained will not be used on any other project. The release and payment for the files must be received PRIOR to delivery of the CAD files.
2. Equipment, including but not limited to: air distribution devices (diffusers, etc.), air terminal units (PIU's, etc.), ductwork accessories, insulation, etc.

2.04 AS-BUILT DRAWINGS

A. The Contractor shall maintain on a daily basis at the Project site a complete set of "Record Drawings". The "Record Drawings" shall consist of a set of black-line or blue-line prints or AutoCAD files of the Contractor Coordination Drawings for this Division. The prints shall be marked or the AutoCAD file electronically updated to show the precise location of all work and equipment, and all changes and deviations in the work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite instructions from the Architect or Engineer. The continuously updated coordination drawings (shop drawings previously described) shall be used to produce the final "Record Drawings" which shall be delivered to the Owner in AutoCAD electronic format (CD) upon Project completion.

B. Record dimensions shall clearly and accurately delineate the work as installed; locations shall be suitably identified by at least two dimensions to permanent structures.

C. The Contractor and Subcontractor shall mark all "Record Drawings" on the drawings with a rubber stamp impression or an AutoCAD image that states such.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The equipment selections used in the preparation of the Contract Documents will fit into the physical spaces provided and indicated, allowing ample room for access, servicing, removal and replacement of parts, etc. Adequate space shall be allowed for clearance in accordance with the Code requirements and the requirements of the local Authorities having jurisdiction, and the equipment manufacturer‘s recommendations.

B. In the preparation of Drawings, a reasonable effort to accommodate acceptable equipment manufacturer's space requirements has been made. However, since space requirements and equipment arrangement vary according to each manufacturer, the responsibility for initial access, maintenance access, code required access, and proper fit rests with the Contractor.

C. Physical dimensions and arrangements of equipment to be installed shall be subject to the Architect's and Engineer's review.

D. The General Contractor and all Subcontractors shall coordinate the installation of ductwork, conduit, busway, piping, cable trays, etc., installation with lighting fixtures, special ceiling construction, air distribution equipment, and the structure. Provide additional rises, drops and offsets as required. If after installed, new ductwork, conduit, busway, piping or cable is found to be in conflict with the architecture, structure, or other trade Work which is either existing or shown on the Contract Documents, the ductwork, conduit, busway, piping or cable shall be relocated without additional cost to the Owner.

E. Accessibility and Clearance:
1. Mechanical equipment, ductwork, etc. shall be installed in accessible locations, avoiding obstructions, preserving headroom, and keeping openings and passageways clear.
2. Minor adjustments in the locations of equipment shall be made where necessary, providing such adjustments do not adversely affect functioning of the equipment.

F. Scaffolds and staging for installation of mechanical work shall be provided under the work of this Division.

3.02 STRUCTURAL FITTINGS

A. Furnish and install the necessary sleeves, inserts, hangers, anchor bolts, and related structural items. Install at the proper time.

B. Openings may have been indicated on the Architectural drawings. Should any additional openings or holes be required, the same shall be provided at no additional cost to the Owner.

C. Location: At a time in advance of the work, verify openings shown on the Architectural drawings, and coordinate any additional openings.

D. If the work of this Section requires modification of the Architectural drawings, furnish new instructions as to requirements for these openings. Submit for review and coordination to Architect.

E. Sleeves shall be supplied for mechanical piping passing through walls or slabs and shall be placed before concrete is poured.

F. Equipment supports for mechanical work shall be fastened to the structure by inserts, anchor bolts, bolting to drilled and tapped structural members, or be welded to the structure.
1. Welding shall be done by the electric arc method with fully competent welders. Supporting members shall be shop coated with a suitable primer.
2. Surfaces damaged by installation of supports shall be touched up with primer to match shop coat. Any drilling of structural members shall be approved by the Architect.

G. Anchor bolts and inserts shall be galvanized and of adequate size and strength for installation of electrical work and shall be placed in forms before concrete is poured.
1. Placement of bolts in bases shall be done under other Division. Furnish detail drawings, templates, and anchor bolts for bases to the General Contractor in time to avoid delaying work schedules.
2. Expansion shields shall only be used with specific approval of the Architect. Wooden or soft metal plugs shall not be used.

H. Cutting and patching:

1. All additional cutting, patching and reinforcement of construction of building, subject to review by the Architect, shall be performed under this Section.
2. Refer to appropriate Division for requirements.

3.04 CLEANING

A. Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.

B. Painted exposed work soiled or damaged: Clean and repair to match adjoining work before final acceptance.

C. Remove dust and debris from inside and outside of material and equipment.

3.05 TESTS AND DEMONSTRATIONS

A. All systems shall be tested in the presence of the Owner or an Owner designated representative upon completion of the Work and demonstrates that the installation is in accordance with the Contract Documents.

B. All motors shall be checked and adjusted for correct direction of rotation.

C. Any work found not to be in compliance with the Contract documents shall be repaired or replaced without incurring additional cost to the Contract price.

D. Provide all instruction to the Owner on maintenance and operation of all systems and equipment provided under this Division.

3.06 WARRANTIES

A. The warranty period for all systems, equipment, components, work, etc. shall be no less than one (1) year, unless specified otherwise hereinafter and shall include at least one (1) full heating season and one (1) full cooling season. The warranty shall include parts and labor.

B. The Contractor shall, without cost to the Owner, remedy any defects within a reasonable time to be specified in notice from the Architect. In default thereof, the Owner may have such work done and charge all costs to the Contractor.

C. The start of the Contractor's warranty period, as defined in the General Conditions, shall commence on the issue of a "Certificate of Substantial Completion", by the Owner or the Owner's Representative for each item of material, equipment or system.

D. The Subcontractor shall confer with the General Contractor prior to the bid date concerning the project schedule and determine if there is a need to operate any items of equipment or systems for temporary heating and/or cooling or other reasons prior to "Substantial Completion". All required extended warranty costs

for equipment, materials, and systems shall be included in the Subcontractor's bid.

END OF SECTION

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SECTION 230553 HVAC EQUIPMENT AND PIPING IDENTIFICATION

PART 1 - GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the identification of equipment and piping. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the identification of equipment and piping specified herein and/or as indicated on the drawings.

1.02 DESCRIPTION OF WORK

A. Work Included: Identification of mechanical equipment shall consist of equipment labeling, as specified hereinafter.
   1. In general, all equipment shall be labeled.
   2. Equipment and device identification specified in other sections shall be provided as a part of those requirements.

1.03 ACCEPTABLE MANUFACTURERS

A. Labels, markings, and tags shall be manufactured by W.H. Brady, Seton, Allen, or Industrial Safety Supply.

PART 2 - PRODUCTS

2.01 EQUIPMENT LABELING

A. Equipment labeling shall be provided with plastic (Bakelite) 4” x 6” nameplates. Nameplates shall be black with white letters.

PART 3 - EXECUTION

3.01 GENERAL

A. Identification labeling, marking, and tagging shall be applied after insulation and painting has been completed.

B. Coordinate names, abbreviations, and other designations used in mechanical identification work with corresponding designations shown, specified, or scheduled on drawings. Prior to ordering any labels, markings, or tags, obtain the approval of the Engineer regarding names, abbreviations, etc.

C. The Plumbing, HVAC, and Fire Protection Contractors shall coordinate labeling, marking, and tagging to ensure consistent and coordinated identification. In existing buildings, utilize similar names, abbreviations, and other designations that are currently in use to remain consistent with existing identification.

D. Equipment labeling shall consist of unit designation as shown on the drawings. Exhaust fan labeling shall also indicate service or the room or area of service.

E. Ductwork markers shall be placed on piping and ductwork on 25’ centers in mechanical rooms and concealed spaces. In locations where ductwork is exposed, place markers on 50’ centers. Flow directional arrows should be marked on the piping at taps from the main and riser.

END OF SECTION

SECTION 230593 TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the testing, adjusting, and balancing of HVAC systems. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Provide testing, adjusting, and balancing specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

1.02 DESCRIPTION OF WORK

A. Work Included:
1. All air systems serving building areas in scope per the drawings shall be tested, adjusted, and balanced to optimize operating and comfort conditions. Record test data as outlined hereinafter and submit for review and approval.
2. Conduct tests as specified herein, and as required by authorities having jurisdiction, including Local Inspection Department or Construction Manger.
3. Repair or replace defects discovered or resulting from the required tests to a like new condition.

1.03 QUALITY ASSURANCE

A. Personnel: Submit evidence to show that the personnel who will actually balance the systems are qualified. Evidence showing that the personnel have passed the tests required by the Associated Air Balance Council (AABC) or the National Environmental Balancing Bureau (NEBB) will be sufficient.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

3.01 TEST DATA

A. General: Record test data after balancing has been completed and deliver recorded data to the Engineer for review and evaluation. Should deficiencies or discrepancies be found, repeat balancing procedures to achieve correct test data results. Certify the test and balancing data as being true and correct over the Contractor's signature. Execute the Certification by an authorized officer if the contracting firm is a corporation, by a partner if the firm is a partnership, by the firm's owner if the firm is a sole proprietorship, or by

the authorized representative if the firm is a joint venture. Include a copy of the approved test and balancing data in the Owner's Manual.

B. Test Forms: Record and submit test and balancing data on forms similar to those of the AABC or NEBB.

3.02 CALIBRATION TEST

A. Submit evidence to show that the balancing devices are properly calibrated before proceeding with system balancing.

3.03 PRELIMINARY AIR TESTING

A. General: Preliminary air tests shall be performed before duct work or equipment is enclosed in walls, floors, ceilings, chases, or in any other way concealed from view. Tests may be conducted on individual systems. Submit notification when systems are ready for preliminary air tests. Condenser water shall not be required for preliminary air tests. Make necessary arrangements to energize fan motors for the tests. Where possible, conduct the tests before the application of exterior duct insulation and installation of grilles or diffusers. Remove section of duct to allow design airflow at design static pressure where necessary.

B. Tests: Demonstrate that there is no excessive leakage of the duct work by visual inspection, that fans are operating at essentially the correct speed, that motors will not overload, and that equipment delivers design cfm. Correct any deficiencies found. Repeat preliminary air tests until tests have proven satisfactory.

C. Inspection: Inspection and acceptance of the Work shall, in addition to the foregoing requirements, be subject to the following conditions:
1. Instruments: Test instruments, devices, and similar items, their accuracy and the methods by which instruments are employed, shall be approved by AABC or NEBB for use at the job site.

3.04 FINAL AIR BALANCE

A. General: When tests have been completed and systems are complete and ready for operation, perform the following steps of final air balance and record the results.

B. Motors: Verify correct rotation of rotating equipment. Verify that properly sized thermal heater elements are installed in starters. Verify that properly sized duel-element fuses, where specified, are installed in disconnect switches.

C. Filters: Check air filters or filter media. Balance system only with clean filters or filter media.

D. Airflow at Each Unit: Read and record return and/or outside air, supply air cfm, and temperature at each fan and blower.

E. Water flow at Each Unit: Set thermostat for full heating loads. Measure and record supply and return water flow at each heating coil.

F. Coil Temperatures: Set thermostat for full cooling and for full heating loads. Read and record entering and leaving dry bulb and wet bulb temperatures at each cooling and heating coil.

G. Outlet Airflow: Adjust each supply diffuser, register, and grille to within 10% of design air cfm. Dampers in diffusers (if specified) may be used for only 10% adjustment from full open airflow. Include terminal points of air supply and points of exhaust.

END OF SECTION

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SECTION 230700 HVAC INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the insulation of HVAC duct. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the insulation system specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

1.02 QUALITY ASSURANCE

A. Manufacturer: Approved manufacturers are Armstrong, Calsite, Cell-U-Foarm Corp, Ceelco, Certainteed Corp, Dow Chemical Company, Forrest Mfg Co, Foster / Chilers, Gemco, Johns Manville, Knauf Fiberglass, Midwest Fastners, Owens Corning Fiberglass, Pittsburg Corning Fiberglass, Rubatex, Trymer, and Venture Tape.

B. All insulation, jacket and adhesive shall have a fire and smoke hazard ratings as tested under ASTM E 84, NFPA 255, and UL 723 not exceeding:

Flame Spread:	25
Fuel Contributed:	50
Smoke Developed:	50

Exceptions: Type B Insulation and PVC Fitting Covers

1.03 SUBMITTALS

A. Per Section 23 01 00.

B. Product Data
1. Type F Insulation
2. Type G Insulation

1.04 DEFINITIONS

A. The phrase "Storm Drainage Conductor" refers to that portion of the storm drain interior to the building, between the roof drain body and where the pipe goes below grade.

B. The word “plenum” shall mean a ceiling space or mechanical room used for the transfer of conditioned return and/or outside air.

PART 2 - PRODUCTS

2.01 DUCTWORK INSULATION

A. Type F – Duct Wrap
1. Duct insulation shall be 2" thick, minimum 3/4 lb. density fiberglass with an FSKL aluminum foil jacket, reinforced with fiberglass scrim.
2. Conductivity (k) equals approximately 0.24 (BTUHR., SF., degrees F, IN) at 75 °F.
3. Integral UL rated vapor barrier of:
   a. Aluminum foil reinforced with fiberglass scrim laminated to 30-lb. kraft paper.
   b. Class I white vinyl 0.004 inch thick, where specified.
2. Similar to Johns Manville Corp "Microlite", or approved equal.

B. Type G - Duct Liner
1. Closed cell foam type.
2. Duct liner adhesive shall comply with ASTM C916 "Specifications for Adhesives for Duct Thermal Insulation".
3. Liner Fasteners: Mechanical or weld secured fasteners for duct liner where finish of duct is not exposed. For exposed ductwork, except in mechanical rooms, provide adhesively secured fasteners. Position fasteners are recommended by SMACNA

4. Minimum Sound Absorption coefficients shall be:

	125	250	500	1000	2000	4000
Coefficient	0.34	0.42	0.47	0.64	0.80	0.79
Attenuation*	3	5	12	24	21	17

* Attenuation in dB per 10 lineal feet, per ASTM E477

2.02 INSULATION ACCESSORIES

A. The following accessories shall be used in the application of the thermal insulations specified under this Section:
1. Vapor Seal Mastic: Similar to Childers CP-35, or approved equal.
2. Lagging Adhesive: Similar to Childers CP-52, or approved equal.
3. Wire: 16 gauge soft stainless steel.
4. Insulation Bonding Adhesive (To Metal): Similar to Childers CP-82, or approved equal.
5. Insulating and Finishing Cement: Similar to Insulco Smooth Kote, or approved equal.
6. Mechanical Fasteners - Welded or adhered pins with speed clip washers: Similar to Gemco Midwest Fasteners, or approved equal.
7. Wire Mesh: 1 inch by 20-gage stainless steel hexagonal wire netting.

PART 3 - EXECUTION

3.01 INSULATION APPLICABILITY

A. Medium Pressure Supply Ducts – Type F insulation required

Insulation Thickness (in)	Duct Sizes (in)
2	all

B. Low Pressure Supply Ducts – Type F insulation required

Insulation Thickness (in)	Duct Sizes (in)
2	all

Notes:

a. The above thicknesses are the minimum required. All local codes and local energy codes shall be complied with.
b. Insulation types and thickness are a minimum standard. Each application shall be carefully considered and insulation product type and thickness shall be appropriate for each specific application. Submit all insulation products with verification of their service intent.

3.02 TYPE F INSTALLATION

A. Ductwork Insulation Application:
1. Apply insulation tightly and smoothly to duct.
2. Secure insulation on the bottom of ducts and plenums and on the sides of plenums and other places where the insulation will sag and max 3” from any corner.
3. Impale insulation over pins or anchors located not more than 18 inches apart and hold in place with washers and clips.
4. Cut off protruding pin after clips are secured and seal with 2-mil. aluminum foil backed pressure sensitive tape.
5. Apply insulation with joints tightly butted.
6. Seal all ductwork joints, punctures and fittings with a mastic type sealant containing a vapor barrier.
7. Cover all breaks, joints, punctures and voids in vapor barrier jacket with a 4” wide woven glass fabric tape embedded in vapor barrier, fire resistant adhesive, such as Foster 20-80 vapor barrier. Pressure sensitive tape shall not be used.
8. Bevel insulation around nameplates, access plates and doors.
9. Insulation shall be continuous through walls and floors except at fire dampers.

3.03 TYPE G INSTALLATION

A. Internal Lining Insulation Application:
1. Apply where specified herein.
2. Apply liner in accordance with SMACNA Duct Liner Application Standard, later edition.
3. Provide metal liner for the sound lining. Metal liner to be 24 gauge galvanized sheet metal with perforation of 3/32” diameter holes on 3/16” center. Properly fasten liner to the duct so that liner does not sag or vibrate.

3.04 FLEX DUCT

A. Flexible ductwork runouts to diffusers and grilles shall be wrapped in fiberglass insulation and sheathed in reinforced, metallized polyester jacket. Minimum insulated value of R=6.0.

END OF SECTION

SECTION 230900 DIRECT DIGITAL CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the direct digital controls. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the direct digital controls specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

1.02 WORK INCLUDED

A. Provide all necessary BACnet-compliant hardware and software to meet the system's functional specifications. Provide Protocol Implementation Conformance Statement (PICS) for Windows-based control software and every controller in system, including unitary controllers.

B. Prepare individual hardware layouts, interconnection drawings, and software configuration from project design data.

C. Implement the detailed design for all analog and binary objects, system databases, graphic displays, logs, and management reports based on control descriptions, logic drawings, configuration data, and bid documents.

D. Design, provide, and install all equipment cabinets, panels, data communication network cables needed, and all associated hardware.

E. Provide and install all interconnecting cables between supplied cabinets, application controllers, and input/output devices.

F. Provide and install all interconnecting cables between all operator's terminals and peripheral devices (such as printers, etc.) supplied under this section.

G. Provide complete manufacturer's specifications for all items that are supplied. Include vendor name of every item supplied.

H. Provide supervisory specialists and technicians at the job site to assist in all phases of system installation, startup, and commissioning.

I. Provide a comprehensive operator and technician training program as described herein.

J. Provide as-built documentation, operator's terminal software, diagrams, and all other associated project operational documentation (such as technical manuals) on approved media, the sum total of which accurately represents the final system.

K. Provide new sensors, dampers, valves, and install only new electronic actuators. No used

components shall be used as any part or piece of installed system.

1.03 SYSTEM DESCRIPTION

A. New direct digital controls shall be integrated in the existing building automation system (BAS).

B. Room sensors shall be provided with digital readout that allows the user to view room temperature, view outside air temperature, adjust the room setpoint within preset limits and set desired override time. User shall also be able to start and stop unit from the digital sensor. Include all necessary wiring and firmware such that room sensor includes field service mode. Field service mode shall allow technician to balance VAV zones and access any parameter in zone controller.

C. All application controllers for every terminal unit (VAV, HP, UV, etc.) air handler, all central plant equipment, and any other piece of controlled equipment shall be fully programmable. Application controllers shall be mounted next to controlled equipment and communicate with building controller via BACnet LAN.

1.04 APPROVED MANUFACTURER

A. The existing BAS manufacturer is Siemens Building Automation. Automated Logic Controls and Johnson Controls are also approved manufacturers.

1.05 QUALITY ASSURANCE

A. Responsibility: The supplier of the EMCS shall be responsible for inspection and Quality Assurance (QA) for all materials and workmanship furnished.

B. Component Testing: Maximum reliability shall be achieved through extensive use of high-quality, pre-tested components. Each and every controller, sensor, and all other DDC components shall be individually tested by the manufacturer prior to shipment.

C. Tools, Testing and Calibration Equipment: The EMCS supplier shall provide all tools, testing, and calibration equipment necessary to ensure reliability and accuracy of the system.

D. The systems control contractor shall have been in business a minimum of five years and be the authorized installing contractor for the manufacturer of the BACnet components.

E. Control system shall be engineered, programmed and supported completely by WayPoint Systems, Inc or their assigned representative’s local office.

1.06 REFERENCE STANDARDS

A. The latest edition of the following standards and codes in effect and amended as of supplier's proposal date, and any applicable subsections thereof , shall govern design and selection of equipment and material supplied:
1. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).
2. ANSI/ASHRAE Standard 135-2001, BACnet.
3. Uniform Building Code (UBC), including local amendments.
4. UL 916 Underwriters Laboratories Standard for Energy Management Equipment.

Canada and the US.
5. National Electrical Code (NEC).
6. FCC Part 15, Subpart J, Class A
7. EMC Directive 89/336/EEC (European CE Mark)

B. City, county, state, and federal regulations and codes in effect as of contract date.

C. Except as otherwise indicated the system supplier shall secure and pay for all permits, inspections, and certifications required for his work and arrange for necessary approvals by the governing authorities.

1.07 SUBMITTALS

A. Drawings
1. The system supplier shall submit engineered drawings, control sequence, and bill of materials for approval.
2. Drawings shall be submitted in the following standard sizes: 11" x 17" (ANSI B).
3. Eight complete sets (copies) of submittal drawings shall be provided.
4. Drawings shall be available on CD-ROM.

B. System Documentation

Include the following in submittal package:
1. System configuration diagrams in simplified block format.
2. All input/output object listings and an alarm point summary listing.
3. Electrical drawings that show all system internal and external connection points, terminal block layouts, and terminal identification.
4. Complete bill of materials, valve schedule and damper schedule.
5. Manufacturer's instructions and drawings for installation, maintenance, and operation of all purchased items.
6. Overall system operation and maintenance instructions—including preventive maintenance and troubleshooting instructions.
7. For all system elements—operator's workstation(s), building controller(s), application controllers, routers, and repeaters,—provide BACnet Protocol Implementation Conformance Statements (PICS) as per ANSI/ASHRAE Standard 135-2001.
8. Provide complete description and documentation of any proprietary (non-BACnet) services and/or objects used in the system.
9. A list of all functions available and a sample of function block programming that shall be part of delivered system.

C. Project Management
1. The vendor shall provide a detailed project design and installation schedule with time markings and details for hardware items and software development phases. Schedule shall show all the target dates for transmission of project information and documents and shall indicate timing and dates for system installation, debugging, and commissioning.

1.08 WARRANTY

A. Warranty shall cover all costs for parts, labor, associated travel, and expenses for a period of TWO years from completion of system acceptance.

B. Hardware and software personnel supporting this warranty agreement shall provide on-site or off-site service in a timely manner after failure notification to the vendor. The maximum acceptable response time to provide this service at the site shall be 24 hours Monday through Friday, 48 hours on Saturday and Sunday.

C. This warranty shall apply equally to both hardware and software.

1.09 RELATED WORK IN OTHER SECTIONS

A. Refer to Division 0 and Division 1 for related contractual requirements.

B. Refer to Section 23 01 00 for General Mechanical Provisions

C. Refer to Section 26 01 00 for General Electrical Provisions

PART 2 – PRODUCTS

2.01 VAV BOX CONTROLLERS—SINGLE DUCT

A. Provide one native BACnet application controller for each VAV box that adequately covers all objects listed in object list for unit. All controllers shall interface to building controller via MS/TP LAN using BACnet protocol. No gateways shall be used. Controllers shall include on board CFM flow sensor, inputs, outputs and programmable, self-contained logic program as needed for control of units.

B. BACnet Conformance
1. Application controllers shall as a minimum support MS/TP BACnet LAN types. They shall communicate directly via this BACnet LAN at 9.6, 19.2, 38.4 and 76.8 Kbps, as a native BACnet device. Application controllers shall be of BACnet conformance class 3 and support all BACnet services necessary to provide the following BACnet functional groups:
   a. Files Functional Group
   b. Reinitialize Functional Group
   c. Device Communications Functional Group
2. See the BACnet Functional Groups, in the BACnet standard, for a complete list of the services that must be directly supported to provide each of the functional groups listed above. All proprietary services, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.
3. Standard BACnet object types supported shall include as a minimum—Analog Input, Analog Output, Analog Value, Binary Input, Binary Output, Binary Value, Device, File and Program Object Types. All proprietary object types, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.

C. Application controllers shall include universal inputs with 10-bit resolution that can accept 3K and 10K thermistors, 0–5 VDC, and dry contact signals. Inputs on controller may be either analog or digital. Controller shall also include support and modifiable programming for interface to intelligent room sensor with digital display. Controller shall also include binary outputs on board. For applications using variable speed parallel fans, provide a single analog output selectable for 0-10 V or 0-20 mA control signals. Application controller shall include microprocessor driven flow sensor for use in pressure independent control logic. All boxes shall be controlled using pressure independent control algorithms and all flow readings shall be in CFM (LPS if metric).

D. All program sequences shall be stored on board application controller in EEPROM. No batteries shall be needed to retain logic program. All program sequences shall be executed by controller 10 times per second and shall be capable of multiple PID loops for control of multiple devices. Programming of application controller shall be completely modifiable in the field over installed BACnet LANs or remotely via modem interface. Operator shall program logic sequences by graphically moving function blocks on screen and tying blocks together on screen. Application controller shall be programmed using the same programming tool as Building Controller and as described in operator workstation section. All programming tools shall be provided as part of system.

E. Application controller shall include support for intelligent room sensor. Display on room sensor shall be programmable at application controller and include an operating mode and a field service mode. All button functions and display data shall be programmable to show specific controller data in each mode based on which button is pressed on the sensor. See sequence for specific display requirements for intelligent room sensor.

F. On board flow sensor shall be microprocessor driven and precalibrated at the factory. Precalibration shall be at 16 flow points as a minimum. All factory calibration data shall be stored in EEPROM. Calibration data shall be field adjustable to compensate for variations in VAV box type and installation. All calibration parameters shall be adjustable through intelligent room sensor. Operator workstation, portable computers and special hand-held field tools shall not be needed for field calibration.

G. Provide duct temperature sensor at discharge of each VAV box that is connected to controller for reporting back to operator workstation.

2.02 SENSORS AND MISCELLANEOUS DEVICES

A. Temperature Sensors
   1. All temperature sensors to be solid state electronic, factory-calibrated to within 0.5°F, totally interchangeable with housing appropriate for application. Wall sensors to be installed as indicated on drawings. Mount 48 inches about finished floor. Duct sensors to be installed such that the sensing element is in the main air stream. Immersion sensors to be installed in wells provided by control contractor, but installed by mechanical contractor. Immersion wells shall be filled with thermal compound before installation of immersion sensors. Outside air sensors shall be installed away from exhaust or relief vents, not in an outside air intake and in a location that is in the shade most of the day.

B. Intelligent Room Sensor with LCD Readout
   1. Sensor shall contain a backlit LCD digital display and user function keys along with temperature sensor. Controller shall function as room control unit, and shall

allow occupant to raise and lower setpoint, and activate terminal unit for override use—all within limits as programmed by building operator. Sensor shall also allow service technician access to hidden functions as described in sequence of operation.

2. The Intelligent Room Sensor shall simultaneously display room setpoint, room temperature, outside temperature, and fan status (if applicable) at each controller. This unit shall be programmable, allowing site developers the flexibility to configure the display to match their application. The site developer should be able to program the unit to display time-of-day, room humidity and outdoor humidity. Unit must have the capability to show temperatures in Fahrenheit or Centigrade.
3. Override time may be set and viewed in half-hour increments. Override time count down shall be automatic, but may be reset to zero by occupant from the sensor. Time remaining shall be displayed. Display shall show the word "OFF" in unoccupied mode unless a function button is pressed.
4. See sequence of operation for specific operation of LCD displays and function keys in field service mode and in normal occupant mode. Provide intelligent room sensors as specified in point list.
5. Field service mode shall be customizable to fit different applications. If intelligent room sensor is connected to VAV controller, VAV box shall be balanced and all air flow parameters shall be viewed and set from the intelligent room sensor with no computer or other field service tool needed.

C. Field Service Tool
1. Field service tool shall allow technician to view and modify all setpoints and tuning parameters stored in application controller. In addition, technician shall be able to view status of all inputs and outputs on digital readout. Each piece of data shall have a data code associated with it that is customizable.
2. Field service tool shall plug into wall sensor and provide all the functionality specified. Operator workstation shall include the capability to disable operation of the field service tool.
3. Provide one Field Service Tool for this project.

D. Network Connection Tool
1. Network connection tool shall allow technician to connect a laptop to any MS/TP network or at any MS/TP device and view and modify all information throughout the entire BACnet network. Laptop connection to tool shall be via Ethernet or PTP.
2. Provide quick connect to MS/TP LAN at each controller. Tool shall be able to adjust to all MS/TP baud rates specified in the BACnet standard.
3. Proved XX Network Connection Tools for this project.

2.03 ELECTRONIC ACTUATORS

A. Quality Assurance for Actuators
1. UL Listed Standard 873 and C.S.A. Class 4813 02 certified.
2. NEMA 2 rated enclosures for inside mounting, provide with weather shield for outside mounting.
3. Five-year manufacturers warranty. Two-year unconditional and three-year product defect from date of installation.

B. Execution Details for Actuators

1. Furnish a Freeze-stat and install "Hard Wire" interlock to disconnect the mechanical spring return actuator power circuit for fail-safe operation. Use of the control signal to drive the actuators closed is not acceptable.
2. Each DDC analog output point shall have an actuator feedback signal, independent of control signal, wired and terminated in the control panel for true position information and troubleshooting. Or the actuator feedback signal may be wired to the DDC as an analog input for true actuator position status.
3. VAV box damper actuation shall be Floating type or Analog (2-10vdc, 4-20ma).

C. Actuators for Dampers shall be non-stall electric type unless otherwise specified, provide actuators as follows:
1. UL Listed Standard 873 and Canadian Standards association Class 481302 shall certify Actuators.
2. NEMA 2 rated actuator enclosures are. Use additional weather shield to protect actuator when mounted outside.
3. 5 year Manufacturers Warranty. Two-year unconditional + Three year product defect from date of installation.
4. Mechanical spring shall be provided when specified. Capacitors or other non-mechanical forms of fail-safe are not acceptable.
5. Position indicator device shall be installed and made visible to the exposed side of the Actuator. For damper short shaft mounting, a separate indicator shall be provided to the exposed side of the Actuator.
6. Overload Protection: Actuators shall provide protection against actuator burnout by using an internal current limiting circuit or digital motor rotation sensing circuit. Circuit shall insure that actuators cannot burn out due to stalled damper or mechanical and electrical paralleling.
7. A push button gearbox release shall be provided for all non-spring actuators.
8. Modulating actuators shall be 24Vac and consume 10VA power or less.
9. Conduit connectors are required when specified and when code requires it.

D. Damper Actuators:
1. Electric damper actuators (including VAV box actuators) shall be direct shaft mounted and use a V-bolt and toothed V-clamp causing a cold weld effect for positive gripping. Single bolt or setscrew type fasteners are not acceptable.
2. One electronic actuator shall be direct shaft mounted per damper section. No connecting rods or jackshafts shall be needed.

2.04 ENCLOSURES

A. All controllers, power supplies and relays shall be mounted in enclosures.

B. Enclosures may be NEMA 1 when located in a clean, dry, indoor environment. Indoor enclosures shall be NEMA 12 when installed in other than a clean environment.

C. Enclosures shall have hinged, locking doors.

D. Provide laminated plastic nameplates for all enclosures in any mechanical room or electrical room. Include location and unit served on nameplate. Laminated plastic shall be 1/8" thick sized appropriately to make label easy to read.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence.

B. Notify the owners' representative in writing of conditions detrimental to the proper and timely completion of the work.

C. Do not begin work until all unsatisfactory conditions are resolved.

3.02 INSTALLATION (GENERAL)

A. Install in accordance with manufacturer's instructions.

B. Provide all miscellaneous devices, hardware, software, interconnections installation and programming required to ensure a complete operating system in accordance with the sequences of operation and point schedules.

3.03 LOCATION AND INSTALLATION OF COMPONENTS

A. Locate and install components for easy accessibility; in general, mount 48 inches above floor with minimum 3'-0" clear access space in front of units. Obtain approval on locations from owner’s representative prior to installation.

B. All instruments, switches, transmitters, etc., shall be suitably wired and mounted to protect them from vibration, moisture and high or low temperatures.

C. Identify all equipment and panels. Provide permanently mounted tags for all panels.

3.04 INTERLOCKING AND CONTROL WIRING

A. Provide all interlock and control wiring. All wiring shall be installed neatly and professionally, in accordance with Specification Division 26 and all national, state and local electrical codes.

B. Provide wiring as required by functions as specified and as recommended by equipment manufacturers, to serve specified control functions. Provide shielded low capacitance wire for all communications trunks.

C. Control wiring shall not be installed in power circuit raceways. Magnetic starters and disconnect switches shall not be used as junction boxes. Provide auxiliary junction boxes as required. Coordinate location and arrangement of all control equipment with the owner's representative prior to rough-in.

D. Provide auxiliary pilot duty relays on motor starters as required for control function.

E. Provide power for all control components from nearest electrical control panel or as indicated on the electrical drawings—coordinate with electrical contractor.

F. All control wiring in the mechanical, electrical, telephone and boiler rooms to be installed

in raceways. All other wiring to be installed neatly and inconspicuously per local code requirements. If local code allows, control wiring above accessible ceiling spaces may be run with plenum rated cable (without conduit).

3.05 DDC OBJECT TYPE SUMMARY

A. Provide all database generation.

B. Displays
1. System displays shall show all analog and binary object types within the system. They shall be logically laid out for easy use by the owner.

C. Trendlog
1. All binary and analog object types (including zones) shall have the capability to be automatically trended.

D. Alarm
1. All analog inputs (High/Low Limits) and selected binary input alarm points shall be prioritized and routed (locally or remotely) with alarm message per owner's requirements.

E. Database Save
1. Provide back-up database for all stand-alone application controllers on disk.

3.06 FIELD SERVICES

A. Prepare and start logic control system under provisions of this section.

B. Start-up and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.

C. Provide the capability for off-site monitoring at control contractor's local or main office. At a minimum, off-site facility shall be capable of system diagnostics and software download. Owner shall provide phone line for this service for 1 year or as specified.

D. Provide Owner's Representative with spare parts list. Identify equipment critical to maintaining the integrity of the operating system.

3.07 AS BUILT DOCUMENTATION REQUIRED

A. Final as-built drawings shall be provided in addition to all operations and maintenance documents. Documents shall be provided on one CD and five paper copies.

3.08 TRAINING

A. Provide application engineer to instruct owner in operation of systems and equipment.

B. Provide system operator’s training to include (but not limited to) such items as the following: modification of data displays, alarm and status descriptors, requesting data, execution of commands and request of logs.

C. Provide EIGHT hours of on-site training.

3.09 DEMONSTRATION

A. Provide systems demonstration under provisions of Section 23 01 00.

B. Demonstrate complete operating system to owner's representative.

C. Provide certificate stating that control system has been tested and adjusted for proper operation.

PART 4 - SEQUENCE OF OPERATIONS

4.01 GENERAL

A. Provide a complete and operational temperature control and building automation system based on the points and sequence of operation specified in section 23 09 93 “Sequence Of Operations for HVAC Controls”. The system shall be complete as to sequences and standard control practices. The determined point list is the minimum amount of points that are to be provided. If additional points are required to meet the sequence of operation, they will be provided.

B. BACnet Object List
   1. The following points as defined for each piece of equipment are designated as follows:
      a. Binary Out (BO) - Defined as any two-state output (start/stop) (enable/disable), etc.
      b. Binary In (BI) - Defined as any two-state input (alarm, status), etc.
      c. Analog In (AI) - Defined as any variable input (temperature) (position), etc.
      d. Analog Out (AO) - Defined as any electrical variable output. 0–20mA, 4–20mA and 0–10VDC are the only acceptable analog outputs. The driver for analog outputs must come from both hardware and software resident in the controllers. Transducers will not be acceptable under any circumstance.

END OF SECTION

SECTION 230993 SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1: GENERAL

1.01 VARIABLE AIR VOLUME – TERMINAL UNIT

Run Conditions - Scheduled:
The unit shall run according to a user definable time schedule in the following modes:

- Occupied Mode: The unit shall maintain:
  - A 75°F (adj.) cooling setpoint
  - A 70°F (adj.) heating setpoint.
- Unoccupied Mod: The unit shall maintain:
  - A 85°F (adj.) cooling setpoint.
  - A 65°F (adj.) heating setpoint.

Alarms shall be provided as follows:

- High Zone Temp: If the zone temperature is greater than the cooling setpoint by a user definable amount (adj.).
- Low Zone Temp: If the zone temperature is less than the heating setpoint by a user definable amount (adj.).

Zone Setpoint Adjust:
The occupant shall be able to adjust the zone temperature heating and cooling setpoints at the zone sensor (+/- 2°F).

Zone Optimal Start:
The unit shall use an optimal start algorithm for morning start-up. This algorithm shall minimize the unoccupied warm-up or cool-down period while still achieving comfort conditions by the start of scheduled occupied period.

Zone Unoccupied Override:
A timed local override control shall allow an occupant to override the schedule and place the unit into an occupied mode for an adjustable period of time. At the expiration of this time, control of the unit shall automatically return to the schedule.

Reversing Variable Volume Terminal Unit - Flow Control:
The unit shall maintain zone setpoints by controlling the airflow through one of the following:

Occupied:

- When zone temperature is greater than its cooling setpoint, the zone damper shall modulate between the minimum occupied airflow (adj.) and the maximum airflow (adj.) until the zone is satisfied.

- When the zone temperature is between the cooling setpoint and the heating setpoint, the zone damper shall maintain the minimum occupied airflow (adj.).
- When zone temperature is less than its heating setpoint, the zone damper shall maintain the minimum occupied airflow (adj.). The existing PIU shall provide heating for the zone.

Unoccupied:

- When the zone is unoccupied the zone damper shall control to its minimum unoccupied airflow (adj.).
- When the zone temperature is greater than its cooling setpoint, the zone damper shall modulate between the minimum unoccupied airflow (adj.) and the maximum airflow (adj.) until the zone is satisfied.
- When zone temperature is less than its unoccupied heating setpoint, the zone damper shall modulate closed. The existing PIU shall provide heating for the zone.

Discharge Air Temperature:
The controller shall monitor the discharge air temperature.

Alarms shall be provided as follows:

- High Discharge Air Temp: If the discharge air temperature is greater than 120°F (adj.).
- Low Discharge Air Temp: If the discharge air temperature is less than 40°F (adj.).

	Hardware Points				Software Points					
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Zone Temp	×							×		×
Zone Setpoint Adjust	×									×
Airflow	×							×		×
Discharge Air Temp	×							×		×
Zone Damper		×								×
Zone Override			×					×		×
Airflow Setpoint					×			×		×
Heating Mode						×		×		
Schedule							×			
Heating Setpoint								×		×
Cooling Setpoint								×		×
High Zone Temp									×	
Low Zone Temp									×	
High Discharge Air Temp									×	

	Hardware Points				Software Points					
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Low Discharge Air Temp									×	
Totals	**4**	**1**	**1**	**0**	**1**	**1**	**1**	**8**	**4**	**9**

END OF SECTION

SECTION 233000 DUCTWORK

PART 1 - GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the duct systems. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the duct systems specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

1.02 DESCRIPTION OF WORK

A. Work Included:
1. Provide sheet metal ductwork as specified herein.

B. Types: The types of ductwork specified in this Section include, but are not necessarily limited to the following:
1. Air conditioning cooling and/or heating supply and return air systems

C. VAV Supply Air Ductwork Upstream of Terminal Units (round or flat oval): Ductwork shall be sheet metal designed for velocities up to 2,800 fpm. The ductwork shall meet the latest SMACNA Standards for construction and stiffening based on the maximum pressure in the ductwork. Ductwork shall be 3” W.C. pressure class.

D. VAV Supply Air Ductwork Upstream of Terminal Units (rectangular): Ductwork shall be sheet metal designed for velocities up to 2,300 fpm. The ductwork shall meet the latest SMACNA Standards for construction and stiffening based on the maximum pressure in the ductwork. Ductwork shall be 3” W.C. pressure class.

E. Supply Air Ductwork Downstream of Terminal Units: Ductwork shall be sheet metal ductwork designed for velocities up to 1,500 fpm or a friction rate of 0.10 inches water column per 100 feet of duct, whichever is most stringent. The ductwork shall meet the latest SMACNA Standards for construction and stiffening based on the maximum pressure in the ductwork. Ductwork shall be 1” W.C. pressure class.

I. Flexible Ductwork: Ductwork connections to HVAC terminal units and air devices shall be made with flexible ductwork connection where shown on the Drawings. Additional connections may be made using flexible ductwork at the Contractors opinion, where approved in writing, in advance, by the Engineer. Insulated value of Flexible duct shall be R-6 or greater.

J. Ductwork Insulation: Refer to section 23 07 00, “HVAC Insulation”, for duct insulation.

K. Ductwork Accessories: Refer to Section 23 33 00, "Ductwork Accessories", for accessories and specialties related to ductwork systems and installation.

1.03 QUALITY ASSURANCE

A. Design and Installation Standards:
1. SMACNA HVAC Duct Construction Standards, latest edition.
2. ASHRAE Standards: Comply with American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE 70-72) , Method of Testing for Rating the air flow performance of outlets and inlets.
3. ADC Standard 1062R2, Air Diffusing Equipment Test Code.
4. AMCA Standard 210, Test Code for Air Moving Devices.
5. NFPA 90-A, Standard for the Installation of Air Conditioning and Ventilating Systems, 2002 edition.

B. Fire and Smoke Rating Test Standards: ASTM E84, NFPA 255 and UL 723.

1.04 SUBMITTALS

A. Shop Drawings: Submit dimensioned layouts of ductwork showing both the accurately scaled ductwork and its relation to space enclosure. Show modifications of indicated requirements, made to conform to local shop practice and how those modifications ensure that the free area, materials, and weights are not reduced. The shop drawings must be submitted at ¼" = 1'-0" or larger scale and shall include all equipment connected to the duct systems, drawn to scale, based on the equipment submittals. All ductwork and equipment must indicate bottom elevations, referenced to finished floor below (bottom of duct = X'-Y" AFF, e.g.)

PART 2 - PRODUCTS

2.01 DUCTWORK MATERIALS

A. Exposed Ductwork Materials: Where ductwork is indicated to be exposed to view in occupied spaces, provide materials which are free from visual imperfections including pitting, seam marks, roller marks, oil canning, stains, discolorations, and other imperfections, including those which would impair painting.

B. Gauges, Rectangular Ductwork: Fabricate galvanized steel ductwork from the minimum gauges for sizes up to the corresponding maximum long-side dimensions as indicated in SMACNA Duct Construction Standards.

C. Gauges, Round Ductwork: Fabricate lock-form quality galvanized steel ductwork from the minimum gauges for diameters up to the corresponding maximum dimensions as indicated in SMACNA Duct Construction Standards.

D. Fiberglass Duct board: Fiberglass duct board is NOT an acceptable means of air transport.

2.02 MISCELLANEOUS DUCT MATERIALS

A. General: Provide miscellaneous materials and products of the types and sizes indicated and where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connection of ductwork and equipment.

B. Duct Sealant: Provide non-hardening, non-migrating mastic or liquid elastic sealant (type applicable for the fabrication/installation detail) as compounded and recommended by the manufacturer specifically for sealing joints and seams in ductwork.

C. Ductwork Support Materials: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim, and angles for support of ductwork.

D. Duct Liner Adhesive: Comply with ASC-A-7001 by The Adhesive and Sealant Council, Inc. (per SMACNA standards).

E. Duct Liner Fasteners: Comply with SMACNA.

F. Flexible Ductwork: Insulated flexible ductwork shall be Atco Type UPC #036 or UPC #031. Approved equal flexible ductwork by Certainteed Corporation, Flexaust Company, Genflex or Owens-Corning Fiberglass will be acceptable. Provide either 45 degree angle taps with manual volume dampers or "spin-in" taps with manual volume dampers at main duct tap as shown on Drawings. Provide with a minimum R-Value of 6.0 or R-Value of 8.0 when installed in unconditioned spaces.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. Standards: Round and rectangular sheet metal ductwork shall be constructed in accordance with SMACNA "HVAC Duct Constructions Standards", latest Edition, ASHRAE Guide and Data Book, "Handbook of Fundamentals", latest edition, specifically Chapter 25 and NFPA Standard 90-A, "Standard for the Installation of Air Conditioning and Ventilating Systems".

B. All ductwork required for the heating, ventilating and air conditioning systems shall be constructed and erected in a first class workmanlike manner. This work shall be guaranteed for a period of one year from and after the date of acceptance of the job against noise, chatter, whistling, vibration, and free from pulsation under all conditions of operation.

C. The interior surface of all ductwork shall be smooth with no parts projecting into the air stream unless specified to do so. All seams and joints shall be external. The inside of all ductwork shall be thoroughly cleaned and all fans operated to remove any debris prior to connection of air devices.

D. All holes in ducts for damper rods and other necessary devices shall be either drilled or machine punched (not pin punched), and shall not be any larger than necessary. All duct openings shall be provided with sheet metal caps if the openings are to be left unconnected for any length of time.

E. Where ducts, exposed to view (including equipment rooms), pass through walls, floors or ceilings, furnish and install sheet metal collars around the duct.

3.02 COORDINATION

A. Prior to submitting ductwork shop drawings, the Division 23 Contractor shall fully coordinate the routing and height of all ductwork with all other trades and with ceiling heights, lighting fixtures and building construction.

3.03 GENERAL DUCTWORK FABRICATION

A. Duct Gauge and Reinforcing:
1. Rectangular Ductwork: Minimum metal gauges and reinforcement shall be in accordance with SMACNA HVAC Duct Construction Standards (SDCS) Tables 1-3 through 1-13. Minimum aluminum gauges and reinforcement shall be in accordance with SDCS Tables 1-14 through 1-16. Reinforcing shall be installed per SDCS Fig. 1-9 through 1-12.
2. Round Ductwork: Minimum metal gauges for longitudinal and spiral seam round ductwork shall be in accordance with SDCS Table 3-2. Minimum aluminum gauges for longitudinal and spiral seam round ductwork shall be in accordance with SDCS Table 3-3. Longitudinal seam ductwork larger than 12" diameter shall not be permitted unless welded seams are used.
3. Cross-breaking: Cross-break or transverse bead all flat surfaces which are more than 12" wide. Transverse beading shall be on 12" centers and shall be a minimum of 1/8" deep at the center of the bead and 3/8" wide at the base of the bead.
4. Minimum Gauges: The metal gauges listed in the SDCS for round and rectangular ductwork are the minimum recommended. It shall be the Contractor's responsibility to select a metal gauge heavy enough to withstand the physical abuse of installation.

B. Duct Joints And Seams:
1. General: Make all joints airtight. The distance between transverse joints on any size duct shall not exceed 5'.
2. Rectangular Ductwork: Transverse joints and longitudinal seams in ductwork shall be constructed in accordance with SDCS Fig. 1-4 and 1-5. Drive slips may be used on rectangular ductwork on short sides only, up to 18" maximum. Gauge of drive slips shall be at least as heavy as ductwork on which they are installed. Bend drive slips over at least 3/4" at corners. Corner closures shall be in accordance with SDCS Fig. 1-13 through 1-18. All longitudinal seams shall be "Pittsburgh Lock" or button punch snap lock at corner seams and grooved seam or seam welded in sides between corners, in accordance with SDCS Fig. 1-5. At the Contractor's option, transverse joints may be transverse duct flange joints or Ductmate EP12/11 prefabricated galvanized "Ductmate" sections. The proposed gasket material, flange, corner piece and Ductmate details shall be submitted for approval.
3. Round Ductwork: Transverse joints for round ductwork shall be beaded sleeve type constructed in accordance with SDCS Fig. 3-2, properly secured and sealed.

Draw bands shall not be used on round ductwork. Longitudinal and spiral seams shall be constructed in accordance with SDCS Fig. 3-1.

4. Ductwork Sealing: Seal all longitudinal and transverse ductwork joints and seams using SMACNA ductwork sealant to provide positive seal.

C. Connections and Take-offs:

1. Rectangular Ductwork: Parallel flow branches shall be constructed using radius elbow take-offs in accordance with SDCS Fig. 2-7. Branch duct connections shall be 45 degree entry expanded taps constructed in accordance with SDCS Fig. 2-8. Duct-mounted coil connections shall be constructed in accordance with SDCS Fig. 2-11.
2. Round Ductwork: Connections and takeoffs shall be made using 90 degree conical taps, 45 degree lateral taps or wye fittings constructed in accordance with SDCS Fig. 3-4 and 3-5. Use of 90 degree tees shall not be allowed.
3. Spin-in Fittings: Spin-in fittings may be used for duct taps to air supply devices and shall include quadrant dampers even though a volume damper may be specified for the air device. Spin-in fittings shall be sealed at the duct tap with a gasket and compression fit or sealed with duct sealant. The location of spin-in fittings in the ducts shall be determined after terminal units are hung and the location of the light fixtures is known so as to minimize flexible duct lengths and sharp bends. Spin-ins shall be installed with their damper axis parallel to airflow. A minimum of 18” must be provided between fittings.
4. Flexible Joints In Ductwork: Provide flexible connections where ductwork connects to air-handling units, fans, and similar powered equipment items and where required for expansion and contraction of the ductwork or the building structure. A minimum of one inch (1") slack shall be provided in all flexible connection to insure vibration isolation. Flexible joints are not required where equipment is connected with flexible duct. Flexible connections shall be rigidly connected to metal work on each side and shall be airtight. Bond flanges of flexible duct connectors to ducts and housings to provide airtight connections. Seal seams and penetrations to prevent air leakage.

D. Elbows and Tees:

1. Rectangular Ductwork: Provide radius or square elbows in ductwork, where shown on the Drawings. Where radius elbows are shown, radius elbows must be provided. Where square elbows are shown, square or radius elbows may be provided, at the Contractor's option. Elbows shall be constructed in accordance with SDCS Fig. 2-2. Turning vanes are required in all square elbows of 46 degrees or greater angle. Turning vanes are not required in radius elbows. Turning vanes shall be single vane type without a trailing edge and shall be constructed and installed in accordance with SDCS Fig. 2-3 and 2-4.
2. Round Ductwork: Provide radius elbows of the stamped or segmented type constructed in accordance with SDCS Fig. 3-3. Segmented elbows shall have a minimum of three segments for 45 degree elbows and five segments for 90 degree elbows.

E. Offsets and Transitions: Where duct width increases, maximum angle of slope shall be 20 degrees (one inch (1") in 2.7"). Where duct width decreases, maximum angle of slope shall be 30 degrees (one inch (1") in 1.7"). Offsets and transitions shall be constructed in accordance with SDCS Fig. 2-9 and 2-10.

F. Air Device Connections: Make connections to air devices and fabricate air device plenums as detailed on the Drawings and in accordance with SDCS Fig. 2-16 through 2-18.

3.04. DUCTLINER

A. General: The liner shall be applied to the inside of the duct with heavy density side to the air stream and shall be secured in the duct with adhesive, completely coating the clean sheet metal. All joints in the insulation shall be "buttered" and firmly butted tightly to the adjoining liner using fireproof adhesive. Where a cut is made for duct taps, etc., the raw edge shall be accurately and evenly cut and shall be thoroughly coated with fireproof adhesive. On ducts over 24" in width or depth, the liner shall be further secured with mechanical fasteners. The fasteners shall be A.J. Gerrard Company pronged straps, or approved equal, secured to the ducts by fireproof adhesive. The clips shall be 18" maximum spacing and shall be pointed up with fireproof adhesive. Liner shall be accurately cut and ends thoroughly coated with fireproof adhesive so that when the duct section is installed, the liner shall make a firmly butted and tightly sealed joint. Where ducts are lined exterior insulation will not be needed unless otherwise noted, except that the two insulations shall lap not less than 24". Ductliner for velocities over 2,000 fpm shall be as specified except a perforated metal liner shall be used over ductliner for securement, in lieu of fasteners. Ductliner installation and fasteners shall comply with SDCS Fig. 2-22 through 2-25.

3.05 DUCTWORK INSTALLATION

A. General: Assemble and install ductwork in accordance with recognized industry practices which will achieve airtight and noiseless systems, capable of performing each indicated service. Install each run with a minimum of joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers, and anchors of the type which will hold ducts true-to-shape and prevent buckling.

B. Inserts: Install concrete inserts for support of ductwork in coordination with formwork, as required to avoid delays in the work.

C. Completion: Complete fabrication of work at the project as necessary to match shop-fabricated work and accommodate installation requirements.

D. Run Location: Locate ductwork runs, except as otherwise indicated, vertically and horizontally and avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, grams, details, and notations or, if not otherwise indicated, run ductwork in the shortest route which does not obstruct usable space or block access for servicing the building and its equipment.

Hold ducts close to walls, overhead construction, columns, and other structural and permanent-enclosure elements of the building. Limit clearance to 0.5" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork to assure 1.0" clearance of insulation. Wherever possible in finished and occupied spaces, conceal ductwork from view, by locating in mechanical shafts, hollow wall construction or above suspended ceilings. Do

not encase horizontal runs in solid partitions, except as specifically shown. Coordinate the layout with suspended ceiling and lighting layouts and similar finished work.

E. Coordination: Coordinate duct installation with installation of accessories, dampers, coil frames, equipment, controls, and other associated work of the ductwork system.

F. Hangers and Supports:
1. General: All ductwork supports shall be per Section IV of the SMACNA "HVAC Duct Construction Standards - First Edition" with all supports directly anchored to the building structure. Supports shall be on maximum 8'-0" centers with additional supports as required to prevent sagging.
2. Attachment to Structure: Provide hanger attachment to the building structure as specified in Section 15100, "Basic Materials and Methods", and in accordance with SDCS Fig. 4-1 through 4-3.
3. Hangers: Hangers shall be strap or rod sized in accordance with SDCS Table 4-1 and 4-2. Strap hanger attachment to rectangular duct shall consist of a turning strap under the duct a minimum of one inch (1") and securing the strap with one screw into the bottom of the duct and one screw to the side of the duct. Rectangular duct supported on trapeze hangers shall be attached to the trapeze. Round duct attachments shall be constructed in accordance with SDCS Fig. 4-4.
4. Horizontal Ducts: Ducts larger than 50" in their greatest dimension shall be supported by means of hanger rods bolted to angle iron or half round trapeze hangers. Duct shall have at least one pair of supports 8'-0" on centers according to the following:

Angle Length	Angle	Rod Diameter
4'-0"	1-1/2" x 1-1/2" x 1/8"	1/4"
6'-0"	1-1/2" x 1-1/2" x 1/8"	1/4"
8'-0"	2" x 2" x 1/8"	5/16"
10'-0"	3" x 3" x 1/8"	3/8"

5. Vertical Ducts: Ducts shall be supported where they pass through the floor lines with 1-1/2" x 1-1/2" x 1/4" angles for ducts up to 60". Above 60", the angles must be increased in strength and sized on an individual basis considering space requirements.

G. Flexible Ductwork:
1. General: Flexible ductwork shall be provided as shown on Drawings. Flexible ducts shall be installed in a fully extended condition free of sags and kinks, using only the minimum length required to make the connection, subject to the maximum lengths herein and below. Bends in any length of flexible duct shall not exceed 45 degrees for HVAC terminal unit connections or 135 degrees for air device connections and shall not exceed that recommended by the flexible ductwork manufacturer. Unless otherwise shown on the Drawings, the length of any one run of flexible ductwork shall not exceed 2 feet to terminal units or 6 feet to air devices.
2. Supports: Where flexible duct extension exceeds 48", horizontally, a support shall be provided. Duct shall be suspended on 48" centers with a minimum two inch (2") wide flat banding material. Refer to SDCS Fig. 3-9 and 3-10 and Page 3-17 for additional requirements.
3. Terminal Unit Flexible Duct Connections: The terminal ends of the duct core shall be secured by stainless steel worm gear type clamps. The fittings on

terminal units and on sheet metal duct shall be coated with sealant, then the flexible duct core slipped over duct and the clamp tightened, and the connections shall be sealed with duct sealant. Insulation of flexible duct shall be slipped over connection to point where insulation abuts terminal unit or insulation on duct and attached with self-locking nylon straps. The insulation connections shall then be sealed using foil duct tape to provide vapor barrier. Refer to SDCS Page 3-13 and 3-15 for additional requirements.

4. Air Device Flexible Duct Connections: All joints and connections shall be made by turning back the insulation and securing the inner liner with self-locking nylon straps and sealing with two wraps of duct tape. The insulation shall then be placed over the joint, attached with a self-locking nylon strap and sealed on the exterior with an approved foil duct tape. Refer to SDCS Page 3-13 and 3-15 for additional requirements.

H. Duct Mounted Devices:

1. Install duct mounted sensors and control devices furnished under Section 23 09 00, "Building Controls". Provide access doors at each duct mounted control device. Coordinate location of devices and installation requirements with the Section 23 09 00Contractor.
2. Provide duct test ports in ductwork as required to properly balance all air systems. Test ports shall be located per ANSI/ASHRAE Standard III to allow accurate pitot-tube traverse measurements in ductwork.

3.06 CLEANING AND PROTECTION

A. General: Clean ductwork internally, section-by-section of dust and debris as it is installed. Clean external surfaces of foreign substances which might cause corrosive deterioration of the metal or, where ductwork is to be painted, might interfere with painting or cause paint damage.

B. Repairs: Strip protective paper from stainless ductwork surfaces and repair finish or replace ductwork portion wherever it has been damaged.

C. Temporary Closure: At ends of ducts which are not connected to equipment or air distribution devices at the time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent the entrance of dust and debris until such time that connections are to be completed.

END OF SECTION

SECTION 233300 DUCTWORK ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the ductwork accessories. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the duct systems specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

1.02 DESCRIPTION OF WORK

A. Work Included: Provide ductwork accessories as required for the project including the following:
1. Extractors,
2. Turning vanes,
3. Splitter dampers,
4. Access doors,

1.03 QUALITY ASSURANCE

A. SMACNA Compliance: Comply with applicable portions of Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) Duct Construction Standards (latest edition).

B. ASHRAE Standards: Comply with American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc. (ASHRAE) recommendations pertaining to construction of ductwork accessories.

1.04 SUBMITTALS

A. Shop Drawings: Show modifications of indicated requirements, if applicable, made to conform to local shop practice and show how these modifications ensure that the materials and weights are not reduced and that the fabricated units are equivalent to the specified requirements in every significant way.

PART 2 - PRODUCTS

2.01 DUCTWORK ACCESSORIES, FABRICATION AND MATERIALS

A. General: Provide ductwork accessories that comply with the Section 23 30 00, "Ductwork", and other applicable product requirements of ductwork materials noted in this Section.

2.02 FLEXIBLE CONNECTIONS

A. General: Flexible connections shall be UL-labeled, 30 ounces glass fabric-lined with insulation and coated on both sides with neoprene, complete with attachment accessories, "Vent-Glass" by Vent-Fabrics, Inc. or approved equal.

2.03 DUCTWORK HARDWARE

A. General: Damper operators for concealed inaccessible ductwork shall be Young Regulator Company, Catalog No. 700 or No. 315, as shown. Non-insulated accessible ductwork shall be Young Regulator Company, Catalog No. 433. Accessible insulated ductwork shall be Young Regulator Company, Catalog No. 443. Approved equal units by Duo-Dyne or Vent Fabrics, Inc. will be acceptable.

2.04 DIRECTIONAL, VOLUME CONTROL, AND FIRE DAMPERS

A. General: Provide all direction and volume control shown or noted on Drawings. All damper control devices shall be installed so as to be fully concealed in finished rooms and spaces.

B. Control Dampers:
1. Splitter Dampers: Splitter dampers shall be not less than 16 gauge. Splitter dampers shall be 1-1/2 times the width of narrowest duct leaving split, except not less than 12" long and shall have not more than 1/4" less height than duct in which it is installed. Splitter dampers having area less than 2.25 square feet shall be adjusted by means of a locking quadrant mounted on end of shaft. Splitter dampers having larger area shall be adjusted by means of one or more push rods in accordance with Figure 2-5, SMACNA "Low Velocity Duct Construction Standards".
2. Extractors: Provide extractors of the size and type required, with hex-key operated adjustable blades, and with gang operated galvanized steel blades on one-inch centers.
3. Pressure Taps: Where rectangular take-offs of branches from main ducts are used with 45 degree entry, provide manual volume regulators with lockable operators and nylon bushings on both sides of damper blade rod.
4. Round Taps: Where taps to main ducts or their branches are made, provide 45 degree angle taps or 90 degree spin-in taps with manual volume dampers with nylon bushings on both sides of damper blade rod.
5. Multi-leaf Dampers: Where multi-leaf dampers are required, provide opposed blade-type in accordance with Figure 2-12, SMACNA "Low Velocity Duct Construction Standards".

2.05 FLASHING AND COUNTER-FLASHING

A. General: Flashing and counter-flashing shall be as specified in other Divisions of these Specifications.

2.06 DUCT ACCESS DOORS

A. General: Provide hinged duct access doors, gasketed and with insulation where ductwork is indicated to be insulated. Provide construction per SMACNA Standards. Access doors shall be at least 15" x 15".

2.07 MISCELLANEOUS DUCTWORK MATERIALS

A. General: Provide miscellaneous materials for ductwork accessories, including hinges, refrigerator latches, sash locks, bolts and wing nuts, gaskets and pitot tubes as recommended by the ductwork accessories manufacturer for the application indicated.

2.08 TURNING VANES

A. Construct turning vanes in accordance with SMACNA Standards (current edition).

PART 3 - EXECUTION

3.01 INSTALLATION

A. Access Doors: Install access doors so that the doors open against the system air pressure wherever feasible and that their latches are operable from either side, except where the duct is too small to be entered. Provide access to each fire damper link to permit resetting. Comply with the applicable building codes or authority having jurisdiction and NFPA 96.

B. Inspection Plates: Install plates at each primary zone damper and where otherwise required for inspection of operable mechanisms within the duct systems.

C. Multileaf Dampers: Install multileaf volume dampers in each zone duct of multizone units and as otherwise required for balancing.

D. Splitter Dampers: Install splitter dampers at all divisions of ductwork for proper air pattern control.

E. Turning Vanes:
1. Install turning vanes for all rectangular mitered elbows. Install turning vanes in accordance with SMACNA Standards.
2. Turning vanes for Ducts with air velocity less than 2500 FPM: Use single wall type vanes for ducts having width equal to or less than 12 inches.
3. Use double wall type vanes for (2” radius, 2–1/8” spacing) for ducts having widths greater than 12 inches.
4. If duct sizes change in a mitered elbow, use single wall type vanes with a trailing edge extension.
5. Turing vanes for Ducts with air velocity greater than 2500 FPM: Use double wall type vanes (4-1/2” radius, 3-1/4” spacing).

3.02 TESTING

A. General: Check installed ductwork accessories for required operation and leak-proof performance during the system's operational test. Repair or replace faulty accessories, as required to obtain proper operation and leak-proof performance.

END OF SECTION

SECTION 233600 VARIABLE VOLUME AND FAN POWERED TERMINAL UNITS

PART 1 - GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the variable volume and fan powered terminal units. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the variable volume and fan powered terminal units specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

1.02 DESCRIPTION OF WORK

A. Work Included: Provide variable air volume (VAV) terminal units with DDC controller supplied by BAS contractor for factory mounting.

1.03 QUALITY ASSURANCE

A. Provide VAV terminal units complying with ARI 880, Air Volume Terminals.

1.04 SHOP DRAWING AND SUBMITTALS

A. Shop drawings submittals shall include, but are not limited to, the following:
   1. Unit cut-sheets clearly showing all features, accessories, dimensions, weights, and capacities.
   2. Written instructions for equipment to installation.
   3. Wiring and piping diagrams and connection locations.
   4. Performance certifications and test results.
   5. Warranty information.
   6. Additional information as required in Section 23 01 00.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Provide HVAC terminal units of standard materials and components designed and constructed as recommended by the manufacturer and as required for a complete installation in compliance with these Specifications. Units with electrical equipment shall be constructed in accordance with NEMA and NEC and shall include disconnects or fused disconnects where specified required by the NEC.

2.02 VARIABLE VOLUME AIR TERMINAL UNITS

A. General: Provide pressure independent single duct VAV air valve terminal units consisting of a sheet metal housing with a control damper, damper operator, heating coil and flow controls. Single duct VAV air valve/terminal units shall be compatible with the temperature controls as specified in Section 23 09 00, "Direct Digital Control System". Terminal unit capacities and sizes shall be as scheduled and shown on the Drawings.

B. Housing: Shall be constructed of 22 gauge minimum galvanized sheet metal with mechanical seals and gaskets to minimize housing leakage. Housing shall be insulated with one inch (1"), fiber-free insulation meeting the requirements of NFPA 90A and UL 181. Housing shall be provided with a round or oval inlet for use with flexible duct (1800 fpm maximum velocity) and a rectangular outlet for slip and drive connection to sheet metal ductwork (1600 fpm maximum velocity).

C. Control Dampers: Shall be of a low leakage, opposed blade or single blade design with galvanized steel blades and self-lubricating bearings. Dampers shall be selected to limit pressure drop to 0.010" wc pressure loss when operating at a velocity of 2000 fpm.

D. Damper Operator: Shall be a electric type normally closed damper operator rigidly mounted to the terminal unit and connected to the damper with an adjustable linkage. Operators shall be sized to properly operate the unit dampers. Damper shall be factory-mounted and wired including all controls required for operation, except control wiring connections. Operator shall be selected to coordinate with the control sequence specified. All exposed operational/linkage components shall be protected with removable metal covers.

E. Leakage: Overall leakage for the control damper and pressurized portions of the housing shall be less than 3% of nominal cfm at 3" SP, as rated by ADC Test Code 1062 R4.

F. Controls: Pressure independent volume controls shall be factory-installed, including a multipoint air flow sensor for inlet volume measurement, and related accessories and components. Controls shall provide adjustable minimum and maximum cfm limits, adjustable throttling range and a constant throttling range option. Adjustments for control settings and gauge tees for flow measurement and balancing shall be easily accessible. DDC controllers and damper operators shall be furnished by the Temperature Control Contractor for factory-installation, wiring and testing by the terminal unit manufacturer. Controllers shall be located for easy access from the ceiling below the unit. Temperature control functions and sequences shall be as specified in Section 23 09 00, "Direct Digital Controls" and 23 09 93, "Sequence of Operations for HVAC Controls". The terminal unit manufacturer shall provide an appropriately sized volt control power transformer to serve the terminal unit controller. An air flow sensor calibration curve label shall be attached to each terminal unit in a location visible from the unit controller.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install items in accordance with manufacturer's recommendations and instructions.

B. Firmly attach each item to supporting members.

C. Items which vibrate, whistle or rattle when system is in operation are considered defective. Replace any defective unit which cannot be tightened or adjusted to eliminate objectionable noises with new unit.

D. Comply with all applicable code restrictions for installation of units, controls, and interconnecting tubing in ceiling.

END OF SECTION

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SECTION 233700 REGISTERS, GRILLES, AND DIFFUSERS

PART 1 - GENERAL

1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the registers, grilles, and diffusers. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the registers, grilles, and diffusers specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

1.02 DESCRIPTION OF WORK

A. Work Included: Provide air outlets and inlets as required for the finished or non-tenant areas of the project including the following:
   1. Ceiling air registers, grilles, diffusers

1.03 QUALITY ASSURANCE

A. Basis of design is Titus. Other acceptable manufacturers are Krueger, Anemostat, Carnes, Metal Aire, Price, or Tuttle & Bailey.

B. NFPA Compliance: Comply with NFPA 90, as applicable to air diffuser construction and installation.

C. Air Distribution Equipment: Maximum space temperature variation shall not exceed 2°F through the conditioned area from 2’ above the floor to 7’ above the floor. The air outlets shall be selected by the manufacturer to suit the volume, throw, and noise level criteria described in these Specifications, and maintain maximum terminal velocities of 50 fpm, unless otherwise indicated.

PART 2 - PRODUCTS

2.01 AIR OUTLETS AND INLETS

A. General: Provide air outlets and inlets of the size, shape, and type, constructed of materials and components, and with finishes as required. Apply corrosion resistant treatment to surfaces prior to applying prime coat.

B. Ceiling Diffusers: Provide diffusers with corrosion resistant treated surfaces and finished in baked enamel unless otherwise required. Where applicable, provide adapters with diffusers to permit connection to round supply duct.

C. Registers and Grilles:
1. General: Provide registers that contain a key-operated multi-louvered opposed blade damper operable from the face side.
2. Supply Air Register: Provide supply air registers of the double deflection type.
3. Return Air Grilles and Return Air Registers: Provide grilles and registers as required.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Install air outlets and inlets in accordance with manufacturer's written instructions and recognized industry practices to ensure that products serve intended functions.

B. Duct Connection to Diffuser:
1. Where flexible duct is connected to ceiling diffusers, the contractor shall use one of these three methods:
a. Insulated flexible duct with Titus FlexRight flexible duct support, UL listed, to form duct elbow.
b. A sheet metal elbow, externally insulated.
c. Insulated flexible metal duct consisting of flexible metal core of corrugated aluminum with external insulation.
2. In all cases duct connection/elbow shall be made with a bend that has not less than one duct diameter centerline radial.

C. Coordination: Coordinate with other trades, including ductwork, and ductwork accessories, as necessary to interface air outlets and inlets properly with other work.

3.02 FIELD CONTROL QUALITY CONTROL

A. Test installed devices to demonstrate satisfactory compliance with specified and indicated requirements.

END OF SECTION

SECTION 260100 GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. The Drawings are schematic and are not intended to show the exact location of outlets, devices, etc. or the routing of conduit.

B. Dimensions and information regarding accurate locations of equipment, and structural limitations and finish shall be coordinated and verified with other Divisions of Work. Be prepared to provide dimensions and information regarding the Work of this Division to other trades.

C. The right is reserved to relocate any device (receptacle, switch, fire alarm, audio/visual, junction box, outlet, etc.) a maximum of 10'-0" before it is permanently provided without incurring additional cost to the Contract.

1.02 REFERENCE STANDARDS

A. All work shall comply with the most recently revised versions of all local, state and federal codes, ordinances of the authority having jurisdiction, laws, rules and regulations. Any modifications required by any of the above shall be made without any additional cost to the owner. Where requirements between governing Codes and Regulations vary, the more restrictive provision shall apply.

B. Nothing contained in the Contract Documents shall be construed as authority or permission to disregard legal requirements and regulations. The Contractor shall thoroughly review the Documents and bring any such conflicts to the attention of the Architect and Engineer prior to installation.

C. All materials shall be new and shall bear the label of U.L.

1.03 EXISTING CONDITIONS

A. Where work is to be performed in an existing facility, the contractor shall visit the site prior to bid and be familiar with all existing conditions. Special attention shall be given to work to be performed above an existing ceiling.

B. Where existing slabs are to be cut or core drilled, the contractor shall x-ray the existing slabs to avoid cutting or disrupting existing conduits, cables, plumbing or structural members.

C. The electrical service to the building shall not be interrupted without written consent of the building owner.

D. No allowance will be made for lack of knowledge of existing conditions.

E. At the completion of the project, all work under this Division shall be completely integrated with the existing systems and left in perfect operating condition.

F. Where work under this Division disrupts the continuity of any existing to remain circuit or feeder, the Contractor shall repair/replace as necessary to return to a perfectly functional and safe operating condition.

G. Prior to any demolition or construction the Contractor shall have the existing conditions inspected by an EPA, OSHA certified asbestos abatement agency to identify the presence of asbestos. Should any asbestos be found it shall be brought to the immediate attention of the Architect and Owner and specifically identified in writing.

1.04 DEFINITIONS

A. Provide: to furnish, install and connect.

B. Furnish: to supply all materials, labor, equipment, testing apparatus, controls, tests, accessories and all other items customarily required for the proper and complete application.

C. Install: to join, unite, fasten, link, attach, set-up or connect together, complete, tested, and ready for normal satisfactory operation.

D. Engineer: the Engineer of record.

E. Contract Documents: the complete set of Specifications and Drawings of all Divisions.

F. Work: labor, materials, equipment, accessories, controls and other items required for a complete installation.

G. Concealed: embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces or in enclosures.

H. Conduit: rigid steel; intermediate metal conduit (IMC), plastic conduit (PVC), electrical metallic tubing (EMT), or flexible steel conduit.

I. Manufactured Cable: pre-wired metal clad manufactured cable bearing a U.L. label; metal clad cable (MC), health care (HCF).

J. Wiring/Wired: all wire installed in conduit to equipment, device, junction box, light fixture, etc. from panel board or switchgear with all required boxes, connectors, couplings, etc.

K. Exposed: not installed underground or concealed.

L. Equal: equal in quality, workmanship, materials, weight, size, design and efficiency of the specified product, conforming to manufacturers.

M. Supply: to purchase, procure, acquire and deliver complete with related accessories.

N. Authority Having Jurisdiction (AHJ): applicable local, state and federal authorities having jurisdiction over any part of the Scope within this Division and other Divisions.

1.05 SHOP DRAWINGS AND PRODUCT DATA

A. The Contractor shall obtain complete shop drawings, product data and samples from the manufacturers, suppliers, vendors for all materials and equipment as specified herein in various Sections of the Specifications, and shall submit data and details of such materials and equipment for review per Section 01 33 00.

B. Shop drawings and/or product data shall be submitted for the following for review:
1. Switchboards, panelboards, transformers, busway, motor control centers, ground fault system and other equipment associated with the main distribution.
2. Disconnect switches, fuses, motor starters.
3. Lighting fixtures, lighting control system, dimming system, emergency batteries and other equipment associated with lighting.
4. Transient voltage surge protection.
5. Generator, UPS, transfer switches, batteries, static switches, transition switches, switchgear and other equipment associated with emergency and/or standby back-up power systems.
6. Devices, receptacles, switches, coverplates, motion sensors. The product data shall include the manufacturers name, model number, size and color.
7. Conduit, wire, boxes, fittings.

C. Shop drawing shall be submitted as one complete package for all electrical systems. Shop drawing will not be reviewed until all systems are provided to engineer.

D. If the shop drawings are rejected, the engineer will review the submittal one additional time. If the shop drawings are rejected the second time, the engineers' time will be billed to contactor on hourly bases.

1.06 AS-BUILT DRAWINGS

A. The Contractor shall maintain on a daily basis at the Project site a complete set of "Record Drawings". Project Record Documents shall be maintained as specified in Division 01.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer's names and catalog numbers specified in the Contract Documents are intended to describe the material and set the standard of quality. All bids shall be based on material specified. Request for approval of material not specified shall be considered if the request is in written form and submitted to the Architect no later than fourteen (14) days prior to the bid date. All requests shall conform to the provisions of the general and supplementary conditions.

B. When specific names are not stated, only the best available quality of material or equipment shall be submitted for review and used in the installation.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The equipment selections used in the preparation of the Contract Documents will fit into the physical spaces provided and indicated, allowing ample room for access, servicing, removal and replacement of parts, etc. Adequate space shall be allowed for clearance in accordance with the Code requirements and the requirements of the local Authorities having jurisdiction, and the equipment manufacturer‘s recommendations.

B. In the preparation of Drawings, a reasonable effort to accommodate acceptable equipment manufacturer’s space requirements has been made. However, since space requirements and equipment arrangement vary according to each manufacturer, the responsibility for initial access, maintenance access, code required access, and proper fit rests with the Contractor.

C. Physical dimensions and arrangements of equipment to be installed shall be subject to the Architect’s and Engineer’s review.

D. The General Contractor and all Subcontractors shall coordinate the installation of ductwork, conduit, busway, piping, cable trays, etc., installation with lighting fixtures, special ceiling construction, air distribution equipment, and the structure. Provide additional rises, drops and offsets as required. If after installed, new ductwork, conduit, busway, piping or cable is found to be in conflict with the architecture, structure, or other trade Work which is either existing or shown on the Contract Documents, the ductwork, conduit, busway, piping or cable shall be relocated without additional cost to the Owner.

E. No conduit, equipment, busway, etc., shall be installed in the eight (8) inch high zone directly above the ceiling in tenant areas to allow for tenant build-out and flexibility unless otherwise specifically shown on the Drawings or prior written authorization is received from the Engineer.

F. Accessibility and Clearance:
1. Electrical equipment, outlets, junction and pull boxes shall be installed in accessible locations, avoiding obstructions, preserving headroom, and keeping openings and passageways clear.
2. Minor adjustments in the locations of equipment shall be made where necessary, providing such adjustments do not adversely affect functionality of the equipment.

G. Scaffolds and staging for installation of electrical work shall be provided under the work of this Division.

3.02 STRUCTURAL FITTINGS

A. Provide the necessary sleeves, inserts, hangers, anchor bolts, and related structural items. Provide at the proper time.

B. Openings may have been indicated on the Architectural and Structural drawings. Should any additional openings or holes be required, the same shall be provided at no additional cost to the Owner.

C. Location: At a time in advance of the work, verify openings shown on the Architectural and Structural drawings, and coordinate any additional openings.

D. If the work of this Section requires modification of the Architectural or Structural drawings, provide new instructions as to requirements for these openings. Submit for review and coordination to Architect.

E. Sleeves shall be supplied for electrical conduits passing through walls or slabs and shall be placed before concrete is poured.

F. Equipment supports for electrical work shall be fastened to the structure by inserts, anchor bolts, bolting to drilled and tapped structural members, or be welded to the structure.
   1. Welding shall be done by the electric arc method with fully competent welders. Supporting members shall be shop coated with a suitable primer.
   2. Surfaces damaged by installation of supports shall be touched up with primer to match shop coat. Any drilling of structural members shall be approved by the Architect.

G. Flashing:
   1. Wherever conduits pass through the roof or outer walls, base flashing and counter flashing shall be provided.
   2. Such flashing shall be properly installed by skilled workmen, and shall include grouting, mastic or tar application, or other means to insure a permanent, waterproof, neat and workmanlike installation.
   3. Insofar as possible, flashing shall comply with and be similar to requirements for flashing in General Construction Work.

H. Anchor bolts and inserts shall be galvanized and of adequate size and strength for installation of electrical work and shall be placed in forms before concrete is poured.
   1. Placement of bolts in bases shall be done under other Division. Provide detail drawings, templates, and anchor bolts for bases to the General Contractor in time to avoid delaying work schedules.
   2. Expansion shields shall only be used with specific approval of the Architect. Wooden or soft metal plugs shall not be used.

I. Cutting and patching:
   1. All additional cutting, patching and reinforcement of construction of building, subject to review by the Architect, shall be performed under this Section.
   2. Refer to appropriate Division for requirements.

3.03 WEATHERPROOF EQUIPMENT

A. Electrical devices or equipment located in damp, semi-exposed areas shall be weather-resistant. Enclosures shall comply with NEMA Type 3R requirements.

B. Surface mounted outlet boxes shall be cast metal with threaded bolts. Pull or junction boxes shall be cast metal with bolted and gasketed covers.

C. Outlet box covers shall be of a suitable weatherproof type with gaskets, packing glands, weatherproof doors, or other required means to prevent entry of moisture.

D. Lighting fixtures shall be provided with suitable gasket, and UL labeled for location.

3.04 CLEANING

A. Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.

B. Painted exposed work soiled or damaged: Clean and repair to match adjoining work before final acceptance.

C. Remove dust and debris from inside and outside of material and equipment.

3.05 IDENTIFICATION OF CIRCUITS AND EQUIPMENT

A. Numbered adhesive strip tags shall be attached to branch circuit wiring in conduits at every point where runs are broken or terminated. Also tag pull wires in empty conduits.

B. Junction and Pull boxes shall have covers stenciled with box number when shown on the drawings, or circuit numbers according to panel schedules. Data shall be lettered in a conspicuous manner with a color contrasting to finish.

C. All feeders for switchboard shall have labels that indicate the phase and designation.

3.06 TESTS AND DEMONSTRATIONS

A. All systems shall be tested in the presence of the Owner or an Owner designated representative upon completion of the Work and demonstrates that the installation is in accordance with the Contract Documents.

B. All motors shall be checked and adjusted for correct direction of rotation.

C. Loading of circuits and feeders in panelboards shall be checked and balanced.

D. Any work found not to be in compliance with the Contract documents shall be repaired or replaced without incurring additional cost to the Contract price.

E. Provide all instruction to the Owner on maintenance and operation of all systems and equipment provided under this Division.

3.07 WARRANTIES

A. The warranty period for all systems, equipment, components, work, etc. shall be no less than one (1) year, unless specified otherwise hereinafter and shall include at least one (1) full heating season and one (1) full cooling season.

B. The Contractor shall, without cost to the Owner, remedy any defects within a reasonable time to be specified in notice from the Architect. In default thereof, the Owner may have such work done and charge all costs to the Contractor.

C. The start of the Contractor's warranty period, as defined in the General Conditions, shall commence on the issue of a "Certificate of Substantial Completion", by the Owner or the Owner's Representative for each item of material, equipment or system.

D. The Subcontractor shall confer with the General Contractor prior to the bid date concerning the project schedule and determine if there is a need to operate any items of equipment or systems for temporary heating an/or cooling or other reasons prior to "Substantial Completion". All required extended warranty costs for equipment, materials, and systems shall be included in the Subcontractor's bid.

END OF SECTION

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SECTION 260500 RACEWAYS AND WIRING – 600 VOLT

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all raceways and wiring specified herein and as required to provide a complete system throughout the project as indicated on the Drawings.

PART 2 - PRODUCTS

2.01 CONDUIT

A. Galvanized Rigid Steel Conduit (GRC): Rigid steel conduit shall be galvanized, constructed of high-grade raw steel piping, galvanized inside and outside with threaded joints.

B. Intermediate Metal Conduit (IMC): IMC shall be constructed of high-grade steel tubing, galvanized inside and outside with threaded joints. Zinc coating shall be applied by the hot-dip, galvanized process.

C. Electrical Metallic Tubing (EMT): EMT shall be constructed of high-grade steel, zinc coated and galvanized inside and outside.

D. Rigid Plastic Conduit (PVC): PVC conduit shall be polyvinyl chloride rigid scheduled to heavy wall type. PVC conduit shall be joined with PVC couplings of the solvent cement type to provide complete watertight joints. Conduit systems shall be UL listed for direct burial and exposed use.

E. Flexible Metal Conduit: Shall be flexible steel conduit tubing spirally wound having a hot-dip galvanized coating and meeting requirements of UL for flexible metal conduit.

F. Liquid tight Flexible Metal Conduit: Shall be flexible steel conduit spirally wound and shall have a copper grounding strand and factory-applied neoprene jacket. Liquid tight flexible conduit shall meet the requirements of UL.

2.02 CONDUIT FITTINGS

A. GRC and IMC: shall be factory-made taper threaded and of the same material as the conduit. Provide with molded nylon insulating bushing or throat at all boxes and cabinets with locknuts inside and outside. Provide watertight hubs in wet locations for terminations into enclosures. Provide insulated grounding bushing where required.

B. EMT: shall be of the same material as the conduit and shall be hexnut compression or steel setscrew. Provide with molded nylon insulating bushing or throat at all boxes and cabinets. Provided insulated grounding bushing where required.

C. PVC: shall be Schedule 40 and of the same manufacturer as the conduit.

D. Flexible Metal Conduit and Liquidtight Flexible Metal Conduit: Provide couplings at connections between flexible and rigid conduit suitable for that application. Provide with nylon-insulated busing or throat at all boxes and cabinets with locknuts.

E. Expansion Joints: Provide O.Z./Gedney, Type AX expansion joint fittings for all conduit which crosses an expansion joint. Provide with internal ground and external bonding jumper.

F. Wire Support Bushings: Provide for vertical runs as required by the NEC.

2.03 PRE-WIRED MANUFACTURED CABLE

A. Pre-wired manufactured cable may be used for branch circuit wiring for receptacle and lighting circuits where acceptable by the AHJ.

B. Pre-wired manufactured cables shall NOT be used for:
1. Mechanical equipment branch circuits
2. Feeders
3. Homeruns
4. Exposed

C. Conduits connecting receptacle and switch circuits to lighting and power homerun boxes in finished areas, type “MC” cable consisting of one (1), two (2), three (3) or four (4) copper “THW”, “THHN” or “THHN/THWN” insulated phase, neutral and ground conductors. Ground shall be of minimum size required by NEC, as specified in other Sections and as noted on the Drawings.

D. Pre-wired cables used for receptacle and equipment through-out a “health-care facility” shall be type “HCF”, with a continuous green colored metal sheath UL approved for grounding purposes.

E. Pre-wired manufactured cable may be used where concealed in walls or in millwork only. Cable shall run from the first device in the wall or millwork or first light fixture to a structurally mounted junction box no more than 10’-0” from the point which the cable enters the ceiling space or from first light fixture.

F. Cable shall not pass through a fire rated wall or assembly.

G. Acceptable cable manufactures are AFC, Alflex and Southwire.

H. Cable termination fittings shall be O. Z. Gedney C5, T&B #253, Steel City Series XC-400 or approved equal clamp-type, malleable iron fittings. Die-cast fittings are not acceptable.

2.04 JUNCTION BOXES AND PULL BOXES

A. Junction boxes and Pull boxes shall be galvanized steel with mode size and gauge as required by the NEC in accordance with voltage parameters. Covers shall be of the same gauge as the box as shall be screw fastened. Boxes shall be sized as required but no smaller than 4 inches square and 1-1/2 inches deep.

B. Covers shall be accessible.

C. Provide galvanized cast iron or aluminum with threaded hubs and gaskets for outdoor and damp locations.

D. Boxes in grade or underwater shall be cast brass or bronze.

2.05 OUTLET BOXES

A. Outlet boxes shall be UL listed, and of sizes and types required for the application.

B. Boxes Recessed in Construction: Sheet steel boxes, unless noted or required otherwise. Boxes shall be no lighter than 14 gauge and shall be galvanized after fabrication. Set so face of box will finish flush with building surface.
1. For Lighting Fixture Outlets: 4-inch square with raided fixture ring.
2. For Wall Switches, Receptacles, and Communication Use: 4 inch square, one-piece; no sectional boxes permitted. Use boxes with plaster rings in all plastered walls where wall thickness permits. Use boxes less than 1-1/2 inch deep only in locations where deep boxes cannot be accommodated by construction.

C. Boxes Used Outdoors or in Damp/Wet Locations: Cast metal boxes (iron and alloy) with gasketed covers and threaded hubs.

D. Boxes in Hazardous Areas: Approved cast metal boxes with appropriate sealing fittings.

E. Provide blank cover for boxes without fixture or device.

F. Boxes in grade or underwater shall be cast brass or bronze.

G. Cycolac: Per code for pools and fountains only.

2.06 WIREWAYS AND AUXILLARY GUTTERS

A. Wireways shall be constructed in accordance with UL 870. Every component including lengths, connectors, and fittings shall be UL listed and labeled. Provision shall be included in the construction to allow screwing the hinged cover closed without the use of parts other than the standard lengths, fittings, and connectors. It shall also be possible to seal the cover in the closed position with a sealing wire.

B. Wireways shall be constructed with/without knockouts, as required. Enclosure type shall be as required by conditions encountered.

C. Gutters and Wireways shall be suitable for “lay-in” conductors. Connector covers shall be permanently attached so that removal is not necessary to utilize the lay-in feature.

D. All sheet metal parts shall be provided with a rust-inhibiting phosphatizing coating and gray baked enamel finish. All hardware shall be plated to prevent corrosion. All screws installed toward the inside shall be protected by spring nuts or otherwise guarded to prevent wire insulation damage.

E. All connectors shall be slip-in type with self-retaining mounting screws. All hangers shall be two-piece with hook-together feature to permit pre-assembly of wireway and hanger bottom plate before hanging on pre-installed upper bracket.

2.07 SURFACE METAL RACEWAY

A. Surface metal raceway shall be UL listed and labeled; shall be used together with couplings, clips, bushings, straps, connectors, connection covers, elbows, extension boxes, fixture boxes, extension adapters, blank covers and all other required fittings; shall be of the proper size to accommodate the conductors to be installed therein in each case.

2.08 CONDUCTORS – 600 VOLTS OR LESS

A. Provide conductors of stranded copper, 98% conductivity, new building wire, insulated in accordance with the requirements of the NEC. Insulation shall be rated no less than 600-volt. Conductors shall be Type "THWN" or "THHN/THWN". Conductors for service and distribtution feeders shall be "XHHW". Solid conductors terminating in a breaker or device shall be utilized for wire size No. 12. Sizes specified are AWG gauge for No. 4/0 and smaller and circular mils (kcmil) for sizes larger than No. 4/0. Minimum wire size shall be No. 12.

B. Connectors: Make spices and connections in conductors using UL connectors.
1. Stranded Conductors: UL listed, solderless, bolted pressure or compression connectors. Connectors shall be of proper sizes to match conductor sizes.
2. Solid Conductors: UL listed, bolted pressure or spring connectors. Connectors shall be of proper sizes to match conductor sizes.
3. Motor Lead Pigtails: UL listed, crimp lugs with through-bolt fasteners between lugs. Lugs shall be of proper sizes to match conductors. Proper sized dies and tools shall be provided to apply connectors.
4. Lighting Fixture Taps: Electrical spring connectors as specified for solid conductors.
5. Ground connections: Burndy ground clamps or connectors of a type suitable for and having a UL listing for grounding applications.

C. All conductor sizes shown on the Drawings are copper unless specifically noted otherwise. All ground conductors shall be copper.

D. Aluminum conductors may be used for the following if the same or larger capacity of those copper conductors shown or specified and conduits sizes adjusted accordingly. Aluminum conductors shall be hi-compression type. All terminations shall utilize compression fittings. Conductors shall be torqued based on manufacturer's recommendation:
1. Service laterals
2. Panel/Switchboard distribution feeders greater than 100 AMPS and terminating in switch gear, distribution panels, panelboards and transformers .
3. All grounds shall be copper.

2.09 MANUFACTURERS

A. Conduit (GRC, IMC, EMT)

1. Allied
2. Republic
3. Triangle
4. Wheatland

B. Conduit Fittings (GRC, IMC, EMT)
1. Appleton
2. O.Z. Gedney
3. Steel City
4. Thomas and Betts
5. Raco

C. Flexible Metal Conduit
1. AFC
2. Alflex
3. Anaconda
4. International Metal Hose

D. Liquidtight Flexible Metal Conduit
1. American Brass Company
2. Anaconda
3. Electri-Flex Company

E. PVC Conduit and Fittings
1. Thomas & Betts
2. Prime Conduit
3. Cantex
4. Certainteed
5. Triangle

F. Conductors, Copper, 600 Volts or less
1. American Insulated Wire
2. Cablec
3. General Cable
4. Pirelli
5. Southwire
6. Triangle

G. Conductors, Aluminum, 600 volt or less (where specified)
1. Alcan Cable
2. Cablec
3. Southwire

H. Outlets and Boxes
1. Appleton
2. Raco
3. Steel City
4. Midland

PART 3 - EXECUTION

3.01 CONDUIT

A. PVC (encased in 4" concrete on all sides) or Galvanized Rigid Steel (GRC) meeting corrosion resistant protection of NEC 300.6 shall be used for underground service entrance and underground feeders. When PVC is used, a transition to metal conduit shall be made below grade using GRC 90 degree fitting such that only metal conduit exits concrete or ground.

B. GRC or Intermediate Metal Conduit (IMC) shall be used where exposed and subject to physical damage, or installed in damp or wet locations.

C. PVC shall be used for underground branch circuits, underground feeders where run below the slab on grade, 1" maximum in the slab on grade, 1" maximum in the slabs above grade, in concrete columns and concrete wall and in masonry walls.

D. PVC Schedule 80 (or GRC meeting corrosion resistant protection of NEC 300.6) may be used for direct burial for branch circuits only. When PVC is used, a transition to metal conduit shall be made below grade using GRC 90 degree fitting such that only metal conduit exits concrete or ground

E. Electrical Metalic Tubing (EMT) shall be used for branch circuits concealed in walls and ceilings. EMT may be used for feeders where not exposed to damage and/or not installed in wet or damp locations.

F. Flexible Metal Conduit shall be used for connections to rotating or vibrating equipment. The lengths shall be as short as possible, in no case longer than 6' or shorter than 12".

G. Liquidtight Flexible Metal Conduit shall be used for connections to rotating or vibrating equipment where located outdoors or in damp or wet locations. The lengths shall be as short as possible but in no case longer than 6' or shorter than 12". Liquidtight Flexible Metal Conduit shall NOT be located above a ceiling, in an air shaft or in a mechanical room utilized as a return air plenum.

H. Raceways shall be installed as a complete and total wiring enclosure system from outlet to outlet, to junction box, pull box, panel or cabinet prior to the installation of the conductors.

I. All conduit shall be run concealed (except in electrical, mechanical and similar area) unless shown otherwise. Where conduit is run exposed it shall be run in a neat and orderly manner. All conduit shall be run parallel and perpendicular to the building structure.

J. Conduits shall be secured to all boxes, cabinets, panels and equipment with locknuts and bushings and shall be securely fastened in place on intervals required by the Code and local codes; hangers, supports or fastenings shall be provided at each elbow and at the end of each straight run within 3' of a termination to a box or cabinet. All supports shall be independent and shall not use ceiling supporting system wires.

K. Use threaded rods and hangers for supporting single conduit. Multiple conduits shall be supported using a trapeze of Unistrut (or Kindorf) channels and threaded rods with double nut/washer.

L. Provide pullboxes as shown and/or as required by Code and where necessary in the raceway system to avoid excessive runs or too many bends. Boxes shall have removable hinged or screw covers and shall be accessible.

M. The minimum size conduit shall be ½" diameter. Homeruns shall extend from the first outlet or device to the panel designated and shall be a minimum ¾" diameter.

N. Provide non-hardening elastic type duct seal compound for each conduit entering the building from the outside and from one space to another having a normal operating temperature differential greater or less than 10 degrees F.

O. Provide seals around all conduit and sleeves penetrating through walls, partition or ceilings. Provide UL approved fire resistant seal around all penetrations through fire rated barriers to maintain the barrier rating.

P. Provide pull wire or nylon rope in all empty conduits.

3.02 CONDUIT PROTECTION

A. Provide underground conduit with a top cover at least 30" below finished grade and no more than 48".

B. Mark all duct bank runs with a detectible warning tape specifically formulated for prolonged use underground, resistant to alkalis and acids found in soil, installed no less than 8 inches and no more than 12 inches above the top of the duct bank concrete. Place warning tape along the approximate center line of the duct bank run. Warning tape shall be permanent, red in color, continuous printed, aluminum backed tape, compounded for direct burial not less than 3 inches wide and 4 mils thick. Printed legend shall be indicative of general type of underground line below.

C. Mark all underground conduit runs with a detectible warning tape specifically formulated for prolonged use underground, resistant to alkalis and acids found in soil, installed no less than 6 inches and no more than 10 inches above the top of the conduit. Place warning tape along the approximate center line of the conduit run. Warning tape shall be permanent, red in color, continuous printed, aluminum backed tape, compounded for direct burial not less than 3 inches wide and 4 mils thick. Printed legend shall be indicative of general type of underground line below.

3.03 CONDUCTORS – 600 VOLTS OR LESS

A. No conductor shall be smaller than No. 12 except for signal or control circuits.

B. All conductors shall be installed in conduit.

C. Where a connection is made to any terminal of 40 amperes or more and/or conductors No. 8 or larger, copper terminal lugs shall be bolted to the conductors. Where multiple terminal lugs are made, individual lugs for each conductor shall be used. Where aluminum conductors are accepted in this Section or noted on the drawings, the terminations shall be made with high compression lugs as manufactured by Ideal or MAC.

D. A maximum of six (6) current carrying conductors shall be run in a conduit. The neutral shall be considered a current carrying conductor.

E. For homeruns of 120 Volt, 20 amp circuits, where the length of run from the panelboard to the center of the load exceeds 100'-0" the conductors shall be No. 10 minimum. If that length exceeds 200'-0" the conductors shall be No. 8 minimum.

F. For homeruns of 277 Volt, 20 amp circuits where the length of run from the panelboard to the center of the load exceeds 200'-0" the conductors shall be No. 10 minimum.

G. Multiple branch circuits homeruns serving computer loads, electronic lighting ballasts and/or H.I.D. lighting ballasts shall utilize a neutral conductor one trade size larger than the phase conductors or use separate neutrals for each circuit. Neutral conductors for individual branch circuits may be the same size as the phase conductor but not less.

H. Provide an equipment grounding conductor in all feeder and branch circuit conduits. Size per code unless shown otherwise.

I. Conductors shall have color coded jackets the entire length for sizes No. 6 and smaller. The conductors for sizes No. 4 and larger shall have color coded jackets the entire length. Colors shall be as follows:

120/208 Volt System	277/480 Volt System
Phase A – Black	Phase A – Brown
Phase B – Red	Phase B – Orange
Phase C – Blue	Phase C – Yellow
Feeder or Shared Neutral – White	Feeder or Shared Neutral - Gray
Branch Phase A Neutral – White w/ Black Stripe	Branch Phase A Neutral – White w/ Brown Stripe
Branch Phase B Neutral – White w/ Red Stripe	Branch Phase B Neutral – White w/ Orange Stripe
Branch Phase C Neutral – White w/ Blue Stripe	Branch Phase C Neutral – White w/ Yellow Stripe
Ground - Green	Ground - Green

J. Where phase marking tape is used it shall be wrapped 2" wide and located at two (2) locations 6" and 18" from the termination. Phase marking tape for the neutral and grounding conductors shall be provided where visible at any point where the conductor is accessible.

K. Before pulling any wire into conduit, thoroughly swab the conduit and clean the boxes of debris.

L. Run feeders in continuous lengths, without joints or splices. Joints shall occur in branch circuits only in locations where they divide.

M. Run conductors for emergency power in conduits separate from all other wiring.

N. Bundle conductors in switchboards and panelboard cabinets and similar using nylon straps made for the purpose. Conductors No. 8 and larger shall be bundled in individual circuits.

3.04 JUNCTION BOXES, PULL BOXES, AND OUTLET BOXES

A. All junction boxes and pullboxes shall be sized in accordance with the Code.

B. All boxes shall be rigidly secured in position to building structure. Boxes larger than 4" shall be secured at two points.

C. Outlet boxes shall be flush with the finished wall or ceiling, or not more than ¼" back, unless specifically shown as surface mounted or its purpose is to be above the ceiling.

D. Provide galvanized steel or cast type outlet boxes. Where exposed GRC or IMC terminates in a box, provide cast box with threaded hubs.

E. All boxes shall be provided with a cover plate.

F. All outlet boxes shall be mounted vertically unless noted otherwise.

G. Where outlets are shown at the same location but at different heights, they shall be mounted one above the other along the same centerline.

H. The exact mounting height of an outlet may be adjusted slightly to align with masonry joint where approved by the Architect.

I. Verify outlet locations in finished spaces with Drawings of interior details and finishes.

J. Outlets shall NOT be located back to back. Where outlets are shown on opposite sides of a wall, they shall be located in separate stud spaces.

K. Protect floor boxes from entering debris during construction using temporary covers approved by the floor box manufacturer.

L. Provide barriers in outlet boxes for switches separating different phases for voltages exceeding 150 volts to ground.

M. Boxes shall not be supported from a suspended ceiling.

END OF SECTION

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SECTION 260550 ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all equipment, materials, tools and labor to properly identify electrical equipment and related accessories.

B. Provide identification for the following:
1. Switchgear, switchboards, distribution panels, panelboards, disconnect switches, circuit breakers, motor starters, motor control switches, start/stop buttons, EPO switches, and other electrical equipment.
2. Junction boxes and pullboxes.
3. Wiring devices.
4. Wiretags for wiring.
5. Raceways.

C. Related Section
1. 26 24 00 – Service and Distribution.
2. 26 27 00 – Devices.
3. 26 29 00 – Motor Controls and Wiring.

PART 2 - PRODUCTS

2.01 IDENTIFICATION

A. Nameplates
1. Nameplates shall have the surface color and core color for engraved letters as follows:
   a. Normal distribution
      1) 277/480V. equipment – white surface with black core
      2) 120/208V. equipment – black surface with white core
   b. Emergency distribution
      1) 277/480V. equipment – white surface with red core
      2) 120/208V. equipment – red surface with white core
2. Provide a nameplate for each switchgear, switchboard, panelboard, distribution panel, motor starter, disconnect switches, motor control center and similar distribution equipment clearly identifying the equipments' name to match that indicated in the Drawings.
3. Provide a nameplate for each feeder protective device in each switchgear, switchboard, distribution panel, motor control center and any other similar equipment. Identify the specific load it serves.
4. Nameplates shall be bakelite, 1/16" thick minimum with 3/8" high letters.

B. Junction Boxes and Pullboxes

1. Provide identification with permanent ink marking pen on the cover of junction boxes noting the branch circuits and systems within the conduit.
2. Pullboxes shall be marked using stenciled paint noting the voltage and systems served. Letters shall be appropriate height so that they can be read from the floor.
3. Boxes containing Emergency systems: write the abbreviation "EMER" above the circuit number on junction box covers. Write "EMERGENCY" in stenciled "RED" paint on pullboxes above other markings.

C. Disconnect switches and motor starters
1. Provide nameplates as described above for all disconnect switches and motor starters located 8'-0" above finished floor or less. Identify equipment served.
2. Provide identification with permanent ink marking pen on all disconnect switches and motor starters mounted over 8'-0" above finished floor. Write marking clearly and in a location that can be read from the floor when the area is finished (e.g. marking for disconnects serving mechanical equipment that will be above the ceiling when the area is finished shall be located on the bottom or bottom front of the disconnect so it can be read when a ceiling tile is removed).

D. Wiring device wall plates
1. For critical care outlets in health care facilities provide identification on the face of the coverplate with red printed lettering on a white adhesive background as to the panel and circuit the outlet is served. Characters shall be ¼" high.

E. Push button switches
1. Provide nameplates as described above for all push button switches. Letters shall be ¼" high.

F. Emergency power off buttons (EPO)
1. Provide nameplates as described above for EPO switches. Nameplate shall have a red surface and a white core. The letter shall be ½" high reading "EMERGENCY POWER OFF".

G. Wire markers
1. Wire markers for identification of wiring shall be self-adhesive type having letters and numerals indicating feeder or branch circuit number. Locate markings on wiring where visible near the terminations and taps in all junction boxes, outlet boxes, panelboards, distribution panel boards, switchboards and motor control centers.

H. Electrical services
1. Where multiple electrical services are provided to a building, provide nameplates as described above identifying the appropriate service number. Letters shall be 1" high.
2. Where the multiple electrical services are in different locations, provide a nameplate at each service noting the locations of the other service(s) as required by the NEC and the AHJ.

PART 3 - EXECUTION

A. Nameplates shall be applied to a cleaned surface and shall be plumb and level.

END OF SECTION

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SECTION 262400 SERVICE AND DISTRIBUTION – 600 VOLT

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all distribution switchgear as specified herein, as indicated on the Drawings and as required to provide a complete and operating system. All distribution equipment shall be of the same manufacturer including, but not limited to, switchboards, panelboards, transformers, disconnects, and busway.

B. The distribution equipment shall be designed, manufactured and tested in accordance with the latest version of the following standards:
1. NFPA 70
2. NEMA AB1
3. NEMA KS1
4. NEMA PB2
5. NEMA PB1
6. NEMA PB1.1
7. NEMA PB2.1
8. NEMA PB1.1
9. NEMA 250
10. NEMA TP-1-2002
11. ANSI/IEEE C12.1
12. ANSI C39.1
13. ANSI C57.13
14. UL 50, 67, 89, 98, 489
15. ASTM

C. Provide nameplates for all distribution equipment as specified herein and per Section 26 05 50.

1.02 SUBMITTALS

A. The following data shall be submitted according to Section 01 33 00 and Section 26 01 00 and shall include but not be limited to:
1. Physical dimensions, nameplate data, voltage, amperage, plan views, elevations, schematic wiring diagrams, bus capacities, circuit schedule, short circuit ratings, etc.
2. The switchgear manufacturer shall provide a coordination study with settings of all over current protective devices. Over current protective devices shall be fully rated with selective coordination when applied in series with other devices.
3. Over current protective devices serving life safety systems and elevators shall be fully rated with selective coordination when applied in series with other devices.
4. The switchgear manufacturer shall provide an ARC Flash study. Provide labels on all switchboards, panels, and other electrical equipment as required per NEC 110.16.
5. The ARC flash and coordination studies shall be performed in SKM software. A working SKM file shell be provided as part of the study so the owner can update study in the future with SKM software.

B. A ¼" scale dimensioned floor plan shall be provided with the switchgear submittals for all equipment rooms identifying actual size, clearance, access and spacing of the electrical equipment.

1.03 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect, and handle products in conformance with manufacturer's recommended practices as outlined in application installation and Maintenance Manuals.

B. Each switchboard section shall be delivered in individual shipping splits for ease of handling. They shall be individually wrapped for protection and mounted on shipping skids.

C. Inspect and report concealed damage to carrier within their required time period for repair or replacement.

D. Store in a clean, dry space. Maintain factory protection and/or provide an additional heavy canvas or heavy plastic cover to protect structure from dirt, water, construction debris, and traffic. Where applicable, provide adequate heating within enclosures to prevent condensation.

E. Handle in accordance with NEMA PB 2.1 and manufacturer's written instructions. Lift only by lifting means provided for this express purpose. Handle carefully to avoid damage to switchboard internal components, enclosures, and finish.

PART 2 - PRODUCTS

2.02 PANELBOARDS

A. System Description
1. Short circuit rating of panelboards shall be the interrupting rating of lowest rated device in the panel or application UL series for proper main and branch device combinations.
2. Panelboards shall have a maximum of 42 protective devices per panel, including sub-feeders and excluding main overcurrent protective devices. For more than 42 devices, 2 or more panelboards are required.
3. With 2 or more panelboards, sub-feed lug or thru-feed lugs shall be used in all by 1 section of each panelboard. Lugs shall have same capacity as incoming mains.
4. Protective devices shall be molded case circuit breakers.

B. Enclosure
1. Boxes shall be a nominal 20 inches wide and 6 inches deep with wire bending space per the National Electric Code.
2. Fronts shall be door-in-door construction reinforced steel with concealed hinges and concealed trim adjusting screws. Trim clamps are unacceptable.
3. All door locks shall be corrosion proof Valox (or equal) with retractable latches. All door locks shall be keyed for a single key.
4. Clean Lexan (or equal) directory card holders shall be permanently mounted on front door.
5. All panelboard series ratings shall be prominently displayed on dead front shield.

6. Interiors shall permit top or bottom incoming cables.

C. Bus bars
1. Bus bars shall be copper, phase sequenced, fully insulated and supported by high impact Noryl (or equal) interior base assemblies.
2. Bus bars shall be mechanically supported by zinc finished galvanneal steel frames to prevent vibration and damage from short circuits.
3. Terminations shall be UL tested and listed and suitable for UL copper.
4. Provide 1 continuous bus bar per phase. Each bus bar shall have sequentially phased branch circuit connectors for bolt-on branch circuit breakers. Bus bars shall be rated as indicated in Drawings.
5. Split solid neutral bus shall be plated and located in main compartment for all incoming neutral cables to be same length. 200% rated solid neutral shall be provided as indicated on the Drawings and shall be plated copper for non-linear load applications subject to harmonics. 200% rated solid neutral shall be self-certified by Manufacturer.
6. Lugs shall be rated for 75 degree C terminations.
7. Interiors shall be field convertible for top or bottom incoming feed. Main and sub-feed circuit breakers shall be vertically mounted. Main lug interiors up to 400 amperes shall be field convertible to main breaker. Interior leveling provisions shall be provided for flush mounted applications.
8. Log bodies shall bolt in place.

D. Circuit Breakers
1. Molded case circuit breakers shall be bolt-in devices for 120/208V panels and 277/480V panels.
2. All circuit breakers shall have thermal and magnetic trip elements in each pole.
3. Multiple pole breakers shall have internal common trip crossbars for simultaneous tripping of each pole.
4. Circuit breakers shall not be restricted to any mounting location due to physical size.
5. All branch breakers 15 to 100 amperes shall be able to be mounted in any panel position for twin or double mounting without space penalty. Sum of ratings for 2 such twin mounted devices shall not exceed 180 amperes.
6. Main and sub-feed circuit breakers may be vertically or horizontally mounted.
7. Branch breaker panelboard connections shall be copper to copper.
8. All panelboard terminations shall be rated as indicated in Drawings.
9. All breakers shall have an over center mechanism and be quick make and quick break.
10. All breakers shall have handle trip indication and a trip indicator in window of circuit breaker housing.
11. Breaker handle and faceplate shall indicate rated ampacity.
12. Circuit breaker escutcheon shall have standard ON/OFF markings.
13. Main breakers shall be UL listed for use with: Shunt, Under Voltage, and Ground Fault Shunt Trips; Auxiliary and Alarm Switches; and Mechanical Lug Kits.
14. Branch breakers shall be UL listed for use with: Shunt Trips, Auxiliary and Alarm Switches.

E. Finish
1. Boxes shall be corrosion resistant, zinc finish galvanneal.
2. Fronts shall be powder finish painted ANSI 61 gray.

F. Panels shall be manufactured by General Electric, Square D, Cutler-Hammer or Siemens.

2.03 DISCONNECT SWITCHES

A. Switches shall be heavy-duty type. The switch blades shall be visible when the switch is OFF and the cover is open. Lugs shall be front removable and UL listed for 75 degrees C conductor. Provide removable arc suppressor to facilitate easy access to line side up.

B. Switches shall have provisions for a field installable electrical interlock.

C. The switch operating mechanism shall be quick-make, quick-break.

D. Provide padlock provisions for locking in the OFF position.

E. Provide NEMA type enclosure suitable for the application (indoor, outdoor, wet or damp, corrosive, etc.). Type 3R enclosure shall contain no knockouts (supply watertight hubs).

F. Enclosure shall have ON and OFF markings stamped on the enclosure.

G. Switches shall be horsepower rated.

H. Fused disconnect switches shall have rejection type fuse clips with dual element current limiting fuses of rating shown or required by the Manufacturer's nameplate of the equipment being supplied. The UL short circuit rating shall be 200,000 amps RMS SYM when used with Class R or J fuses.

2.04 FUSES

A. Fuses shall have 200,000 Amp RMS SYS rating.

B. Fuses for circuits 1 to 600 amperes shall be dual element, current limiting time delay (500% of rated current for minimum of 10 seconds) with separate overload and short circuit clearing chamber. Bussman "Low Peak" or equal by Littlefuse or Ferraz Shawmut. UL Class J.

C. Fuses for circuits above 600 amperes shall be current limiting, time delay (500% of rated current for minimum of 4 seconds, clear 20 times rated current in 0/1 seconds or less). Bussman, "Hi-Cap" or equal by Littlefuse or Ferraz Shawmut. UL Class L.

D. Provide one (1) set of spare fuses for each set of three (3). A maximum of three (3) sets of fuses is required to be provided for the same type and rating.

PART 3 - EXECUTION

1.01 GENERAL

A. Clean all enclosures free of all foreign matter and dust.

B. Remove all rust marks and repaint to new condition.

C. Provide all necessary hardware to level and secure all switchgear.

D. Provide engraved nameplates on all switchgear per Section 26 05 50 including but not limited to, switchboards, switchboard overcurrent protection devices, panelboards, distributor panelboards, disconnects, contactors, busway, busplugs.

E. Provide a typewritten directory for all panelboards. Make spares in pencil.

1.02 FIELD TESTING

A. Infra-red Testing
1. After the electrical distribution system has been checked, adjusted, calibrated and under load just prior to substantial complete, it shall be subjected to an infra-red thermograph test by a NETA certified technician. The test shall be performed with a minimum load of 20% of the rating of the equipment/connection being tested. Load banks shall be supplied if necessary to provide this load factor.
2. Two (2) copies of the test report shall be provided to the Engineer upon completion of the test. Connections indicated having higher temperatures than acceptable shall be tightened or corrected as required. After corrections have been made, the connections shall be subjected to an additional thermograph test and rechecked to confirm the problem has been corrected.
3. The following components and connections shall be included in the thermograph testing:
   a. Service entrance
   b. Switchboards
   c. Switchboard main and feeder devices
   d. Feeder taps
   e. Busway cable terminations
   f. Busway joints
   g. Bustaps and busplug connections
   h. Emergency distribution system
   i. UPS system
   j. Motor control centers
   k. Distribution panels
   l. Panelboards
   m. Mechanical equipment connections (over 100 amps)
   n. Transformers

END OF SECTION

SECTION 262700 DEVICES

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all devices specified herein, as indicated on the Drawings and as required to provide complete and operating systems.

B. The wiring devices shall be designed, manufactured and tested in accordance with the latest version of the following standards:
1. NEMA WD-1
2. NEMA WD-5
3. Underwriters Laboratories
4. NEC

PART 2 - PRODUCTS

2.01 GENERAL

A. The color of all devices, wall plates and coverplates shall comply with Georgia State University.

2.02 SWITCHES

A. Wall switches, unless noted otherwise, shall be flush mounted, commercial grade 120/277 volt, 20 amp, toggle switches:
1. Single Pole: Leviton No. 1221 Series or equal by Hubbell, P&S or Cooper
2. Double Pole: Leviton No. 1222 Series or equal by Hubbell, P&S or Cooper
3. 3-way: Leviton No. 1223 Series or equal by Hubbell, P&S or Cooper
4. 4-way: Leviton No. 1224 Series or equal by Hubbell, P&S or Cooper

B. Dimmer switches, unless specified otherwise in the Drawings or by the Architect, shall be Lutron Nova T-star series with wattage and type as required by the load and color/finish as selected by the Architect. Provide 3-way and 4-way dimmers where multiple dimmers as shown to control the same lights. Where on/off switches are indicated adjacent to dimmer switches they shall be ganged together and the on/off switches shall also be Lutron Nova T-star series to match the look of the dimmer switches.

C. Motor rated switches and switches indicated as pilot switches, unless noted otherwise, shall be flush mounted industrial grade, red pilot light “on” with overload protection as follows (note: wire per manufacturers recommendation):
a. 120V, 20 amp Circuits – Hubbell HBL1221PL
b. 277V, 20 amp Circuits – Hubbell HBL1221PL
c. 120V, 30 amp Circuits – Hubbell HBL3031PL

D. Key switches, unless noted otherwise, shall be flush mounted, commercial grade, 120/277V, 20 amp:

1. Single Pole: Leviton No. 1221-2L Series or equal by Hubbell, P&S or Cooper
2. Double Pole: Leviton No. 1222-2L Series or equal by Hubbell, P&S or Cooper
3. 3-Way: Leviton No. 1223-2L Series or equal by Hubbell, P&S or Cooper
4. 4-Way: Leviton No. 1224-2L Series or equal by Hubbell, P&S or Cooper

E. Wall switches in back of house areas, unless noted otherwise, shall be commercial grade 120/277 volt, 20 amp, toggle switch Leviton No. 1221 Series or equal by Hubbell, P&S or Cooper.

F. Timer switches, unless noted otherwise, shall be digital time switch 24VAC or 120/277VAC as required. ,Timeout adjustments from 5 minutes to 12 hours. Set timer in the field to 4 hours for equipment rooms and 30 minutes for all other areas. For timer setting greater than 2 hours select the visual flash option and audible sound option. Color shall match that selected for the switches unless noted otherwise.

G. Wall mounted motion sensors, unless noted otherwise, shall be Wattstopper WS-250 for wall munted at switch height and Wattstopper CI-200 for ceiling mounted. Provide power packs, relays, etc. as required to provide a complete system in each area. Color as selected by Architect. Adjust interval to 15 minutes at project completion unless noted otherwise. (Coordinate sensor type with lighting ballasts and provide accessories as required). Approved equal by Leviton or Cooper.

2.03 RECEPTACLES

A. Receptacles shall be plastic, 2P, 3W, grounded as follows:
1. Duplex receptacles - for multi-outlet circuits, 125 volt, 15 amp rating Leviton 5262 Series or equal by Hubbell, P&S or Cooper.
2. Duplex receptacles - for dedicated, single-outlet circuits, 125 volt, 20 amp rating Leviton 5362 series or equal by Hubbell, P&S or Cooper.
3. Duplex isolated ground receptacle -125 volt, 20 amp rating Leviton 5362-IG series (provide color alternate of color for standard receptacles as selected by Architect) or equal by Hubbell, P&S or Cooper.
4. Simplex (single) receptacles -125 volt, 20 amp rating Leviton 5361 series or equal by Hubbell, P&S or Cooper.

C. Ground Fault Interrupter Receptacles (GFCI) shall be plastic, 2P, 3W, 125 volt, 20 amp, self protecting type Leviton 7899 series or equal by Hubbell, P&S or Cooper. Hospital GFCI receptacles shall be Leviton 7898-HG or equal by Hubbell, P&S or Cooper.

D. Weatherproof receptacles shall have a duplex GFCI receptacle as specified above with a gasketed extra-duty in-use weatherproof coverplate T&B CKLSVU or approved equal by P&S, Leviton or Hubbell.

E. Controlled Devices shall be permanently marked (imprinted) with the word “controlled” and power symbol to clearly identify which receptacles are turned off when the workspace is vacant per ASHERA 90.1 2013. Leviton CR020 series or equal by Hubbell, P&S or Cooper.

2.04 COVERPLATES

A. Coverplates shall be satin finish 302 stainless steel standard size (provide jumbo size for concrete and masonry walls) by Leviton or equal by Hubbell, P&S or Cooper.

B. Provide multigang plates for devices shown at the same location. Coordinate gang configuration with the Architect where more than 3 devices are shown at one location.

C. Coverplates for all back-of-house equipment rooms (i.e. mechanical, electrical, loading dock, service corridor, etc.) shall be stainless steel.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Provide appropriate outlet box for each device or multi-ganged devices.

B. Provide plaster ring reducer for boxes larger than the device plate.

C. Provide dimmer switch type and size to match load.

D. Coordinate locations of all devices with the Architect and the interior detail Drawings.

E. Coordinate cutting; obtain pre-cut openings from manufacturer for door switches, metal partitions and furniture mounted devices.

F. In general, devices in finished spaces shall be flush mounted. Verify the requirements of all spaces with the Architect.

G. Each device shall have a coverplate as is appropriate for the application. Coverplates shall be installed true and plumb with building lines, mortar joints and architectural features.

H. Mount receptacles and special systems outlets vertical and 18” above the finished floor to the device centerline, unless noted or required otherwise.

I. Mount switches vertical and 42” above the finished floor to the device centerline and 6” from a door strike, unless noted or required otherwise.

J. All exterior devices shall be provided with a weatherproof cover/enclosure. Exterior receptacles shall be GFCI type.

K. Coordinate mounting heights for devices indicated to be mounted over counter with the Architect.

L. Provide a green insulated bonding jumper for all grounded devices and bond to the outlet box.

M. Each outlet used as a junction box, or for future device or fixture, shall be fitted with a blank coverplate to match other device coverplates.

N. Floor outlets shall be of the necessary type suitable for the application and installed per the manufacturers recommendation. Fire ratings shall be maintained. Where the installation of a specified or required floor box effects the elevated slab/floor fire rating, the necessary fire assembly (approved by the Architect) shall be constructed below the slab.

O. Do not locate junction boxes or voice/data conduit stub downs for poke-thru devices above a non-accessible ceiling. In these cases extend the poke-thru conduit to an accessible ceiling.

END OF SECTION

SECTION 265000 LIGHTING

PART 1 - GENERAL

1.01 SUMMARY

A. Provide lighting fixtures complete with all lamps as specified on the Electrical, Architectural, Interior and Lighting Designer Drawings. Provide all supports, brackets, connectors, materials, tools, wiring, controls and labor to provide a complete and operating lighting system.

B. All blemished, damaged or unsatisfactory fixtures shall be replaced in a satisfactory manner as directed by the Architect.

C. Where a fixture type designated has been omitted, cannot be determined or is in conflict with other Drawings or Specifications, request a clarification from the Architect, prior to bid, and provide suitable fixture type as directed.

D. All lamps shall be operating at project completion and for a period of six (6) months after the final acceptance by the Owner.

E. Confirm exact locations of lighting fixtures with the Architectural Reflected Ceiling Plan and mechanical equipment above or on the ceiling.

F. All recessed lighting fixtures shall match the ceiling type and be tested and certified by the fixture manufacturer for the type of mounting.

1.02 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Handle lighting fixtures carefully to prevent breakage, denting and scoring the fixture finish. Do not install damaged lighting fixtures; replace and return damaged units to equipment Manufacturer.

B. Store lighting fixtures in clean, dry space. Store in original cartons and protect from dirt, physical damage, weather, and construction traffic.

1.03 SUBMITTALS

A. The following submittal data shall be furnished according to Section 01 33 00 and Section 26 01 00 and shall include but not be limited to:
   1. Lighting fixtures complete with physical dimensions, materials, connector details, voltage, current, installation details, air handling capability, etc.
   2. Lamps complete with base or pin configuration, lumen rating, life expectancy, color temperature, starting characteristics, etc.

PART 2 - PRODUCTS

2.01 LIGHTING FIXTURES

A. Base bid lighting fixtures shall be based on manufacturer and descriptions listed. Alternate fixture manufacturers not specified and proposed by the Contractor shall be submitted for approval prior to base bid.

B. Fixtures are designated on the Drawings by "type" as indicated by a letter that corresponds to a lighting fixture description and specification on the lighting fixture schedule.

C. Each lighting fixture shall comply with NEC Article 410, Energy Independence & Security Act, local codes and the authority having jurisdiction.

D. Provide a lighting fixture complete with lamps, ballasts and required accessories for each lighting fixture shown. Provide all mounting and trim hardware to suit the specific installation and location.

E. All lighting fixtures shall bear a U.L. label.

F. Where fixtures are specified with acrylic lens, provide virgin acrylic with 0.125 inch thickness.

G. Exit lighting fixtures shall meet the requirements of all federal, state and local codes.

2.02 DRIVERS

A. Drivers for LED Fixtures
1. Electronic Driver for LED Fixtures: Comply with UL 1310 Class 2 requirements for dry and damp locations. Include the following features unless otherwise indicated:
   a. Rated for 50,000 hours of life, unless otherwise noted.
   b. Sound Rating: Class A.
   c. Total Harmonic Distortion Rating: 15 percent or less.
   d. Current Crest Factor: 1.5 or less.
   e. 0-10V Dimming Standard (Step Dimming does not qualify)

2.03 EMERGENCY BATTERY LIGHTING

A. Lighting fixtures indicated on the drawings to be provided with an emergency battery ballast shall provide emergency lighting by using standard fluorescent lamp or lamps and an emergency battery ballast. The ballast shall consist of a field replaceable high temperature, maintenance free nickel cadmium battery, charger and electronic circuitry contained in one metal case. Provide a solid state charging indicator light to monitor the charger and battery, double pole test switch and installation hardware. The battery ballast shall provide power to the fluorescent lamp upon failure of the normal supply to the fixture.

B. The test button and indicator light shall be integral in the fixture reflector and shall be positioned within or on the surface of the fixture so as to be accessible and identifiable.

C. Under normal mode the battery ballast shall keep the batteries at full charge. Upon loss of normal power the battery ballast shall operate the fluorescent lamp or lamps for 90 minutes.

D. Battery recharge time shall not exceed 16 hours to fully recharge and shall not exceed 225 milliamperes charging current.

E. The lumen output of the lamp or lamps powered by battery unit shall be not less than 1100 lumens initially for a four foot fluorescent lamp.

F. The battery ballast shall meet or exceed all the requirements set forth in UL924 "Emergency Lighting and Power Equipment" and shall be UL listed for installation on top of or remote from the fixture. Emergency illumination shall meet or exceed the requirements set forth in the National Electric Code, Life Safety Code and UL 90-Minute Requirements.

2.06 LED FIXTURES

A. Except as otherwise indicated, provide LED luminaires, of types and sizes indicated on fixture schedules.

B. Include the following features unless otherwise indicated:
1. Each Luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array, and electronic driver (power supply).
2. Each luminaire shall be rated for a minimum operational life of 50,000 hours utilizing a minimum ambient temperature of (25°C).
3. Light Emitting Diodes tested under LM-80 Standards for a minimum of 12,000 hours.
4. Color Rendering Index (CRI) of 82 at a minimum.
5. Color temperature shall be as indicated in the schedule.
6. Rated lumen maintenance at 70% lumen output for 50,000 hours, unless otherwise indicated.
7. Fixture efficacy of 100 Lumens/Watt, minimum.
8. 5 year luminaire warranty, minimum.
9. Photometry must comply with IESNA LM-79.
10. The individual LEDs shall be constructed such that a catastrophic loss of the failure of one LED will not result in the loss of the entire luminaire.
11. Luminaire shall be constructed such that LED modules may be replaced or repaired without the replacement of the whole fixture.

Technical Requirements
1. Luminaire shall have a minimum efficacy of 60 lumens per watt. The luminaire shall not consume power in the off state.
2. Operation Voltage: The luminaire shall operate from a 50 HZ to 60 HZ AC line over a voltage ranging from 120 VAC to 277 VAC. The fluctuations of line voltage shall have no visible effect on the luminous output.
3. Power Factor: The luminaire shall have a power factor of 0.9 or greater.
4. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 15 percent.

5. Operational Performance: The LED circuitry shall prevent visible flicker to the unaided eye over the voltage range specified above.

C. Thermal Management
1. The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life.
2. The LED manufacturer's maximum thermal pad temperature for the expected life shall not be exceeded.
3. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed.
4. The luminaire shall have a minimum heat sink surface such that LED manufacturer's maximum junction temperature is not exceeded at maximum rated ambient temperature.

PART 3 - EXECUTION

3.01 GENERAL

A. Locations on the Drawings are diagrammatic. Verify exact locations with Architectural Reflected Ceiling Plans and coordinate space conditions with other trades.

B. Modify locations in mechanical equipment rooms to suit the conditions of the mechanical equipment while maintaining a sufficient and uniform lighting level equal to that provided by the layout shown on the Drawings.

C. Fixtures of the same type and in the same ceiling shall have lamps, socket assembling and door hinges oriented in the same direction.

D. Reflector cones, baffles, aperture plates, light controlling element for air handling fixtures and decorative elements shall be installed after completion of ceiling tiles, painting and general cleanup.

E. Target and focus adjustable lighting fixtures after regular working hours and before building acceptance. Permanently indicate targeting on fixture and provide positive locking devices to preclude mis-focus relamping. Target and focus in the presence of the Architect and Lighting Designer.

F. Relamp all incandescent and low-voltage fixtures immediately prior to Owner's acceptance of building. Replace non-operating, damaged or darkened fluorescent and high intensity discharge lamps immediately to Owner's acceptance of building.

G. Clean all fixture reflectors, lenses, louver, decorative accessories and lamps immediately prior to Owner's acceptance of building. Destaticize plastic lenses and diffusers after cleaning.

H. Lighting fixtures mounted within, under, on or integral with millwork shall be given special consideration. Fixture counting and sizes shall be coordinated with the applicable space and adjusted accordingly. This coordination shall occur prior to ordering fixtures. Refer to Architectural Drawings for details.

3.02 SUPPORT OF LIGHT FIXTURES

A. Support directly from building structure, any lighting fixture which weighs in excess of the capacity of the suspended ceiling on which it is installed. Support each such fixture with the quantity of threaded rods or fixture support wires required to prevent fixture warping; however provide no less than two rods or wire per fixture.

B. Outlets, which are recessed in a suspended ceiling and support the weight of surface-mounted or suspended fixtures, shall be supported from a channel spanning and secured to the ceiling support system. Support each end of the channel with a fixture support wire attached to structure.

C. Installation in grid-type suspended ceiling:
   1. Support each corner of a grid opening, in which a lay-in fixture is located, with a fixture support wire attached to structure. Provide a support clip, securely fastened to the ceiling grid, at or near each corner of each lay-in fixture.
   2. Support fixtures, which are smaller than the ceiling grid opening and which are recessed in the acoustical panel, with at least two metal channels spanning, and secured to, the ceiling grid. Support each end of each channel or each corner of the grid opening with a fixture support wire attached to structure. Do not support fixtures by ceiling acoustical panels.

D. Provide additional supports as required by local codes and seismic zone.

END OF SECTION

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SECTION 27-00-00 COMMUNICATIONS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Applicable requirements of Division 01 General Requirements shall be considered a part of this section and shall have the same force as if printed herein full.

1.02 QUALITY ASSURANCE

A. Specifications, Standards and Codes

All work shall be in accordance with the following:

1. The 2002 edition of the National Electrical Code (NFPA 70).
2. The 1999 edition of the Standard Building Code.
3. The 1998 edition of the Life Safety Code (NFPA 101).
4. The National Electrical Safety Code (ANSI C-2).
5. National Electrical Manufacturers Association (NEMA)
6. Telecommunications Industries Association (TIA)
7. Electronic Industries Association (EIA)
8. National Electrical Safety Code (NESC)
9. Institute of Electrical & Electronics Engineers (IEEE)
10. Underwriters Laboratories (UL)
11. American Standards Association (ASA)
12. Federal Communications Commission (FCC)
13. Occupational Safety and Health Administration (OSHA)
14. American Society of Testing Material (ASTM)
15. Americans with Disabilities Act (ADA)
16. Local city and county ordinances governing electrical work.

*In the event of conflicts, the more stringent provisions shall apply.

1.03 SCOPE

A. The work to be done under this Section of the Specifications shall include the furnishing of labor, material, equipment and tools required for the complete installation of the work indicated on the Drawings or as specified herein.

B. All materials, obviously a part of the Telecommunications Infrastructures and necessary to its proper operation, but not specifically mentioned or shown on the Drawings, shall be furnished and installed without additional charge.

C. The Drawings and Specifications are complementary to each other and what is called for by one shall be as binding as if called for by both. If a discrepancy exists between the Drawing and Specifications, the higher cost shall be included, and the engineer shall be notified of the discrepancy.

1.04 WORK INCLUDED

The Communications Infrastructures installed and work performed under this Division of the Specifications shall include but not necessarily be limited to the following:

A. Voice/Data Cabling Infrastructure

B. Telecommunications conduits, raceways, cable tray, racks, cabinets and equipment mounting boards as indicated on the Drawings.

C. Grounding and Bonding

D. Underground raceway excavation, backfill, and compaction.

E. Concrete work for duct banks, manholes, hand-holes, vaults and restoration (where applicable).

F. CATV Cabling Infrastructure and Distribution System

1.05 DEFINITIONS

A. Terms: The following definitions of terms supplement those of the GENERAL REQUIREMENTS and are applicable to DIVISION 27 - COMMUNICATIONS.

1. Provide: As used herein shall mean "furnish, install and test (if applicable) complete.
2. Infrastructure: As used herein shall mean “cable, installed in conduit, raceway, cable tray or j-hooks with all required boxes, fittings, connectors, and accessories; completely installed.”
3. Work: As used herein shall be understood to mean the materials completely installed, including the labor involved.

1.06 DRAWINGS

A. Drawings are generally diagrammatic and show the arrangement and location of pathways, outlets, support structures and equipment. The Contractor shall carefully investigate the structural and finish conditions affecting his work and arrange his work accordingly. Should conditions on the job make it necessary to make adjustments to pathways or materials, the Contractor shall so advise the Engineer and secure approval before proceeding with such work.

B. Where exact locations are required by equipment for stubbing-up and terminating conduit

concealed in floor slabs, the Contractor shall request shop Drawings, equipment location Drawings, foundation Drawings, and any other data required by him to locate the concealed conduit before the floor slab is poured.

C. Materials, equipment or labor not indicated but which can be reasonably inferred to be necessary for a complete installation shall be provided. Drawings and Specifications do not undertake to indicate every item of material, equipment, or labor required to produce a complete and properly operating installation.

D. The right is reserved to make reasonable changes in locations of equipment indicated on Drawings prior to rough-in without increase in contract cost.

E. The Contractor shall not reduce the size or number of conduit runs indicated on the Drawings without the written approval of the Engineer.

F. Any work installed contrary to Contract Drawings shall be subject to change as directed by the Engineer, and no extra compensation will be allowed for making these changes.

G. The location of equipment, support structures, outlets, and similar devices shown on the Drawings are approximate only. Do not scale Drawings. Obtain layout dimensions for equipment from Architectural plans unless indicated on Technology plans.

H. Schematic diagrams shown on the Drawings indicate the required functions only. The technology of a particular manufacturer may be used to accomplish the functions indicated without exact adherence to the schematic Drawings shown. Additional labor and materials required for such deviations shall be furnished at the Contractor's expense.

I. Verify the ceiling type, ceiling suspension systems, and clearance above hung ceilings prior to ordering cabling and associated hardware. Notify the Engineer of any discrepancies.

J. Review all architectural Drawings for modular furniture.

K. Portions of these Drawings and Specifications are abbreviated and may include incomplete sentences. Omissions of words or phrases such as "the Contractor shall", "shall be", "as indicated on the Drawings", "In accordance with", "a", "the" and "all are intended" shall be supplied by inference.

1.07 SUBMITTALS

A. Submit for approval, details of all materials, equipment and systems to be furnished. Work shall not proceed without the Owner and/or the Project Manager's approval of the submitted items. Three (3) copies of the following shall be submitted:

1. Submittals for individual systems and equipment assemblies that consist of more than one item or component shall be made for the system or assembly as a

whole. Partial submittals will not be considered, reviewed or stored, and such submittals will not be returned except at the request and expense of the Contractor.

2. Contractor shall generate shop Drawings. Modify reviewed and accepted shop Drawings to include revisions based upon completion of work. Submit shop Drawings with record Drawings on hard copy. Shop Drawings shall include equipment racks, patch panels, termination blocks, connection details, rack mounting details and any other details not included in the construction Drawings.

B. Any materials and equipment listed that are not in accordance with specification requirements may be rejected.

C. The approval of material, equipment, systems and shop Drawings is a general approval subject to the contract Drawings, Specifications and verification of all measurements at the job. Approval does not relieve the Contractor from the responsibility of shop drawing errors. The Contractor shall carefully check and correct all shop Drawings prior to submission for approval. D. Submittals for each section shall vary.

1.08 QUALITY ASSURANCE

A. Equipment and materials required for installation under these Specifications shall be the current model and new (less than one [1] year from the date of manufacture), unused and without blemish or defect.

B. Equipment shall bear labels attesting to Underwriters Laboratories or certification by other recognized laboratory, where subject to label service. Manufacturers of equipment and materials pertinent to these items shall have been engaged in the manufacture of said equipment a minimum of three (3) years and, if so directed by the Owner, be able to furnish proof of their ability by submitting affidavits and descriptive data about their product including size and magnitude comparable to requirements specified herein.

1.09 CONTRACTOR QUALIFICATIONS

A. The Telecommunications Contractor must be certified to extend a NetClear **25-year** Static, Dynamic and Applications Warranty. All contractors must be an approved Ortronics Certified Installer at a Plus tier (CIP, CIP-GOLD, CIP-PLATINUM,) and/or Berk-Tek Certified OASIS Integrator. A copy of certification documents must be submitted with the quote in order for such quote to be valid. The Telecommunications contractor is responsible for workmanship and installation practices in accordance with the Ortronics CI/CIP Program and Berk-Tek OASIS Program. At least 30 percent of the copper installation and termination crew must be certified by BICSI, Berk-Tek, or Ortronics with a Technicians Level of Training.

B. The Contractor shall have total responsibility for the coordination and installation of the work shown and described in the Drawings and Specifications. The Contractor shall be a company specializing in the design, fabrication and installation of integrated

telecommunications systems.

C. Telecommunications Systems specified shall be installed under the direction of a qualified Contractor. Qualification requirements shall include submittal by the Contractor to the Architect of the following:

1. List of previous projects of this scope, size and nature, including names and sizes of projects, description of work, times of completion and names of contact persons for reference.
2. Contractor shall be certified by Berk-Tek/ Ortronics to provide warranty for the cabling system.
3. Contractor shall provide documentation of certification.
4. Contractor shall be licensed by the State of Georgia as a low voltage contractor.

1.10 COORDINATION WITH OTHER TRADES

A. The Contractor shall coordinate telecommunications work with that of other Sections as required to ensure that the entire telecommunications work will be carried out in an orderly, complete and coordinated fashion.

1.11 SITE INVESTIGATION

A. Prior to submitting bids of the project, visit the site of the work to become aware of existing conditions that may affect the cost of the project. Where work under this project requires extension, relocation, reconnections or modifications to existing equipment or systems, the existing equipment or systems, shall be restored to their original condition before the completion of this project.

1.12 PERMITS

A. Obtain all permits and inspections for the installation of this work and pay all charges incident thereto. Deliver to the Owner all certificates of said inspection issued by authorities having jurisdiction.

1.13 RENOVATIONS AND ADDITIONS

A. All work that would adversely affect the normal operation of the other portions of the Owner's property shall be done at a time other than normal working hours. Normal working hours shall be considered eight (8:30) a.m. to five (5:15) p.m. Monday through Friday.

B. Prior to submitting bids on the project, visit the site of the work to become aware of existing conditions that may affect the cost of the project.

C. Where work under this project requires extension, relocation, reconnections or modifications to existing equipment or systems, the existing equipment or systems shall

be restored to their original and operating condition. Remove all equipment indicated to be demolished, including outlets, devices, raceways and support structures.

D. Care shall be exercised in the removal and storage of equipment indicated to be relocated or removed and reused. Prior to placing back into service, equipment shall be cleaned, and marred or chipped paint surfaces touched-up.

E. Provide all coring, cutting and patching to existing walls, floors, etc., required for the removal of existing work or the installation of new work.

1.14 TELECOMMUNICATIONS ROOM SIZES

A. Telecommunications rooms (TR) shall meet or exceed the following size requirements:

1. Telecommunications rooms shall be sized for N+1 racks where N is the number of racks required to house all equipment specified for existing and new services. Therefore minimum closet size shall accommodate at least two racks.
2. Rooms equipped with two (2) equipment racks shall be 10’ x 9’.
3. Rooms equipped with three (3) equipment racks shall be 12’x 9’.
4. Rooms equipped with two (4) equipment racks shall be 15 x 9’.
5. Rooms equipped with more than (4) equipment racks shall be custom designed to accommodate the specific requirements of the site.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

A. Where equipment is identified by manufacturer and catalog number, it shall be as the base of requirements for quality and performance. Where manufacturers for equipment are identified by name, the Contractor may submit for approval, similar equipment of other manufacturers as substitution. The Engineer's decision as to whether the submitted equipment is acceptable shall be final and binding.

B. All changes necessary to accommodate the substituted equipment shall be made at the Contractor's expense, and shall be as approved by the Engineer. Detailed Drawings indicating the required changes shall be submitted for approval at the time the substitution is requested.

C. If substitutions are made in lieu of device specified; form, dimension, design and profile shall be submitted to the Engineer for approval.

D. Submit request for approval of substitute materials in writing to Architect at least ten days prior to bid opening.

2.02 MATERIALS

A. All materials used in this work shall be new and shall bear the inspection label of Underwriters' Laboratories Inc. or certification by other recognized laboratory.

B. The published standards and requirements of the Telecommunications Industries Association (TIA), National Electrical Manufacturers Association (NEMA), the American National Standard Institute (ANSI), the Institute of Electrical and Electronic Engineers (IEEE), and the American Society of Testing Materials (ASTM), are made a part of these Specifications and shall apply wherever applicable.

C. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, for which replacement parts are available.

D. When more than one unit of the same class of equipment or material is required, such units shall be the products of a single manufacturer or partner manufacturers that offer a certified solution.

E. Components of an assembled unit need not be products of the same manufacturer, but must offer a certified end-to-end solution.

F. Manufacturers of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled unit.

G. Components shall be compatible with each other and with the total assembly for the intended service.

PART 3 - EXECUTION

3.01 EXAMINATION OF SURFACE CONDITIONS

A. Prior to the start of work, the Contractor shall carefully inspect the installed work of other trades and verify that such work is complete to the point where installation may properly commence. Start of work indicates acceptance of conditions.

B. Install equipment in accordance with applicable codes and regulations, the original design and the referenced standards.

C. In the event of a discrepancy, immediately notify the Project Manager.

D. Do not proceed with installation until unsatisfactory conditions and discrepancies have been fully resolved.

3.02 PROTECTION OF SYSTEMS AND EQUIPMENT

A. Protect materials and equipment from damage during storage at the site and throughout the construction period. Equipment and materials shall be protected during shipment and storage against physical damage, dirt, theft, moisture, extreme temperature and rain.

B. Damage from rain, dirt, sun and ground water shall be prevented by storing the equipment on elevated supports and covering the sides with securely fastened protective rigid or flexible waterproof coverings.

C. During installation, equipment shall be protected against entry of foreign matter on the inside and be vacuum cleaned both inside and outside before testing, operating or painting.

D. As determined by the Project Manager, damaged equipment shall be fully repaired or shall be removed and replaced with new equipment to fully comply with requirements of the Contract Documents. Decision of the Project Manager shall be final.

E. Damaged paint on equipment and materials shall be repainted with painting equipment and finished with the same quality of paint and workmanship as used by the manufacturer.

3.03 ACCESS TO EQUIPMENT

A. Equipment shall be installed in location and manner that will allow convenient access for maintenance and inspection.

B. Working spaces shall be not less than specified in the National Electrical Code (NEC) for voltages specified.

C. Where the Project Manager determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, equipment shall be removed and reinstalled, one time only, as directed by the Project Manager, at no additional cost to the Owner. "Conveniently accessible" is defined as being capable of being reached without the use of ladders or without climbing or crawling under or over obstacles such as motors, pumps, belt guards, transformers, piping and duct work.

3.04 CLEANING

A. During construction, and prior to Owner acceptance of the building, remove from the premises and dispose of packing material and debris caused by telecommunications work.

B. Remove dust and debris from interiors and exteriors of electrical equipment. Clean accessible current carrying elements prior to being energized.

3.05 COMPLETION

A. General: Upon completion of the work, remove excess debris, materials, equipment,

apparatus, tools and similar items. Leave the premises clean, neat and orderly.

B. Results Expected: Systems shall be complete and operational and controls shall be set and calibrated. Testing, start-up and cleaning work shall be complete.

C. Maintenance Materials: Special tools for proper operation and maintenance of the equipment provided under this Specification shall be delivered to the Owner.

3.06 TESTING AND VERIFICATION

A. See specific Division 27 sections for testing parameters of sub-systems.

B. The Contractor shall verify that requirements of this specification are met. Verification shall be through a combination of analyses, inspections, demonstrations and tests, as described below.

C. Verification by inspection includes examination of items and comparison of pertinent characteristics against the qualitative or quantitative standard set forth in the Specifications. Inspection may require moving or partially disassembling the item to accomplish the verification, included as part of the work at no additional cost to the Owner.

D. The Contractor shall verify by formal demonstrations or tests that the requirements of this Specification have been met. The Contractor shall demonstrate that the telecommunications systems, components and subsystems meet specification requirements in the "as-installed" operating environment during the "System Operation Test". Even though no formal environmental testing is required, the Contractor shall measure and record temperature, humidity and other environmental parameters and the environmental conditions, which were encountered during the "System Operation Test".

E. The Contractor shall carefully plan and coordinate the final acceptance tests so that tests can be satisfactorily completed. The Contractor shall provide necessary instruments, labor and materials required for tests, including the equipment manufacturer's technical representative and qualified technicians in sufficient numbers to perform the tests within a reasonable time period.

F. The Contractor shall satisfy all items detailed in the final acceptance check-off list (punch list). The list shall be a complete representation of specified installation requirements. At the time of final acceptance punch list items shall be corrected until the system is found to be acceptable to the Owner and the Project Manager.

G. After the Contractor systems have been installed and tested, the completed test plan shall be signed by the Telecommunications Contractor Project Manager and submitted for approval.

END OF SECTION

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SECTION 27-05-10
FIRESTOPPING FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Applicable requirements of Division 27 Communications shall be considered a part of this section and shall have the same force as if printed herein full.

B. This document describes the products and execution requirements relating to Firestopping for Communications Systems.

C. Product specifications, general design considerations, and installation guidelines are provided in this document. Typical firestopping installation details will be provided on Drawings as an attachment to this document. If the bid documents are in conflict, the Drawings shall take precedence. The successful vendor shall meet or exceed all requirements described in this document.

1.02 SUBMITTALS

A. Product data: Manufacturer's specifications and technical data including the following:

1 Detailed specification of construction and fabrication.

2. Manufacturer's installation instructions.

1.03 WORK INCLUDED

A. The work included under this Specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The contractor will provide and install all of the required material whether specifically addressed in the technical specifications or not.

B. The work shall include, but not be limited to the following:

1. Furnish and install all Firestopping Materials.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

A. Approved Firestopping manufacturer(s):

1. Flamestopper Thru-Wall Fitting - Wiremold Company (Firestop Devices)
2. Unique Firestop Products (Firestop Devices)
3. STI Firestop Products (Firestop Devices, Putties, Caulks, Sealants, etc.)
4. Hilti (Putties, Caulks, Sealants, etc.)

2.02 TYPES OF PRODUCTS A.

Sealants

1. Intumescent Firestop Sealants and Caulks
2. Latex Firestop Sealant
3. Acrylic Water-Based Sealant
4. Silicone Firestop Sealants and Caulks
5. Firestop Putty
6. Firestop Collars
7. Wrap Strips
8. 2-Part Silicone Firestop Foam
9. Firestop Mortar
10. Firestop Pillows
11. Elastomeric Spray
12. Accessories:
    Forming/Damming Materials: Mineral fiberboard or other type as per manufacturer recommendation.

B. Firestop Devices

1. Thru-Wall Fitting (Flamestopper by Wiremold)
    a. The firestop device box shall be constructed of 16 gage G90 steel.
    b. The firestop device intumescent block shall be constructed of a graphite base material with expansion starting at 375°F and an unrestrained expansion between 6 to 12 times. The intumescent block shall be held securely by the box in order to prevent tampering and damage during installation.

c. The firestop device shall have doors which can be adjusted to prevent materials from penetrating the device if the device is empty or completely full. The doors shall be constructed of 16 gage G90 steel with No. 10-32 screws use to adjust opening size.
d. The firestop device shall be available for 2" and 4" trade size EMT conduit.
e. The firestop device shall be available in safety yellow powder coat, custom colors and an unpainted galvanized finish.

2. Threaded Firestop Device (Unique Firestop Products)
a. Threaded steel sleeve device incorporating flat washers secured by threaded device shall be installed around cables. The device shall be available in 1, 2 and 4-inch sizes. Maximum diameter of the wall penetration for 1, 2 and 4-inch sizes shall be 1-1/4, 2-7/16 and 4-1/2 inches respectively.

3. Smooth Firestop Device (Unique Firestop Products)
a. Smooth steel sleeve device incorporating flat washers secured by sliding compression couplers. The device shall be available in 1, 2 and 4-inch sizes. Maximum diameter of the wall penetration for 1, 2 and 4-inch sizes shall be 1-1/4, 2-7/16 and 4-1/2 inches respectively.

4. Split-Sleeve Firestop Device (Unique Firestop Products)
a. Threaded steel sleeve halves incorporating split couplings and slotted washers to fit the specific diameter of the opening. The device shall be available in 1, 2 and 4-inch sizes. Maximum diameter of the wall penetration for 1, 2 and 4-inch sizes shall be 1-1/4, 2-7/16 and 4-1/2 inches respectively.

5. Fire Rated Cable Pathway (STI EZ-PATH)
a. Fire rated cable pathway device modules shall be comprised of steel racewaywith intumescent foam pads allowing 0-100 percent cable fill.

2.03 UL CLASSIFICATION

A. Thru-Wall Fitting - The firestop device for use in through-penetration firestop systems shall have been examined and tested by Underwriters Laboratories Inc. to UL1479 (ASTM E 814) and bear the U.S. and Canadian UL Classification Mark.

B. Threaded, Smooth and Split-Sleeve Firestop Devices - Firestopping sealants and devices shall be used together as a firestop system. All firestop systems shall bear a UL Classification system number. UL Classification system numbers are as follows:

1. Threaded Firestop System
   a. Block Wall - W-J-3049 b.
      Dry Wall - W-L-3138

2. Threaded Firestop System (Vertical)
   a. Slab - F-A-3010

3. Smooth Firestop System
   a. Block Wall - W-J-3048 b.
      Dry Wall - W-L-3137

4. Split-Sleeve Firestop System
   a. Block Wall - W-J-3047 b.
      Dry Wall - W-L-3136

2.04 FIRESTOPPING SYSTEMS

A. Thru-Wall Fitting Firestop System:

1. The device shall be classified for use in one-, two-, three, and four-hour rated gypsum, concrete and block walls and provide a maximum L rating of six cfm. The devices shall also been tested by Underwriters Laboratories Inc. to UL2043 and determined to be suitable for use in air handling spaces.

B. Threaded, Smooth and Split-Sleeve Firestop Systems:

1. Shall conform to both Flame (F) and Temperature (T) ratings as required by local building codes and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire tests in a configuration that is representative of field conditions.
2. The F rating must be a minimum of one (1) hour but not less than the fire resistance rating of the assembly being penetrated. T rating when required by code authority shall be based on measurement of the temperature rise on penetrating item(s). The fire test shall be conducted with a minimum positive pressure differential of 0.01 inches of water column.
3. For joints, must be tested to UL 2079 with movement capabilities equal to those of the anticipated conditions.

C. Firestopping materials and systems must be capable of closing or filling through-openings created by 1) the burning or melting of combustible pipes, cable jacketing, or pipe

insulation materials, or 2) deflection of sheet metal due to thermal expansion (electrical & mechanical duct work).

D. Firestopping material shall be asbestos and lead free and shall not incorporate nor require the use of hazardous solvents.

E. Firestopping sealants must be flexible, allowing for normal pipe movement.

F. Firestopping materials shall not shrink upon drying as evidenced by cracking or pulling back from contact surfaces.

G. Firestopping materials shall be moisture resistant, and may not dissolve in water after curing.

PART 3 - EXECUTION

3.01 CONDITIONS REQUIRING FIRESTOPPING A.

General:

1. Provide firestopping for conditions specified whether or not firestopping is indicated, and if indicated, whether such material is designed as insulation, safing, or otherwise.

B. Through-Penetrations:

1. Firestopping shall be installed in all open penetrations and in the annular space in all penetrations in any bearing or non-bearing fire-rated barrier.

C. Membrane-Penetrations:

1. Where required by code, all membrane-penetrations in rated walls shall be protected with firestopping products that meet the requirements of third party time/temperature testing.

D. Construction Joints/Gaps:

1. Firestopping shall be provided between the edges of floor slabs and exterior walls, between the tops of walls and the underside of floors, in the control joint in masonry walls and floors and in expansion joints.

E. Smoke-Stopping:

1. As required by the other Sections, Smoke-Stops shall be provided for Through-Penetrations, Membrane-Penetrations, and Construction Gaps with a material approved and tested for such application.

3.02 EXAMINATION

A. Examine the areas and conditions where firestops are to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected.

B. Verify that environmental conditions are safe and suitable for installation of firestop products.

C. Verify that all pipes, conduit, cable, and other items that penetrate fire-rated construction have been permanently installed prior to installation of firestops.

3.03 INSTALLATION

A. General:

1. Installation of firestops shall be performed by an applicator/installer qualified and trained by the manufacturer. Installation shall be performed in strict accordance with manufacturer's detailed installation procedures.
2. Apply firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, and manufacturer's recommendations.
3. Unless specified and approved, all insulation used in conjunction with through-penetrants shall remain intact and undamaged and may not be removed.
4. Seal holes and penetrations to ensure an effective smoke seal.
5. In areas of high traffic, protect firestopping materials from damage. If the opening is large, install firestopping materials capable of supporting the weight of a human.
6. Insulation types specified in other sections shall not be installed in lieu of firestopping material specified herein.
7. All combustible penetrants (e.g. non-metallic pipes or insulated metallic pipes) shall be firestopped using products and systems tested in a configuration representative of the field condition.

B. Dam Construction:

1. When required to properly contain firestopping materials within openings, damming or packing materials may be utilized. Combustible damming material must be removed after appropriate curing. Noncombustible damming materials may be left as a permanent component of the firestop system.

3.04 FIEL D QUALITY CONTROL

A. Prepare and install firestopping systems in accordance with manufacturer's printed instructions and recommendations.

B. Follow safety procedures recommended in the Material Safety Data Sheets.

C. Finish surfaces of firestopping that are to remain exposed in the completed work to a uniform and level condition.

D. All areas of work must be accessible until inspection by the applicable Code Authorities.

E. Correct unacceptable firestops and provide additional inspection to verify compliance with this specification.

3.05 CLEANING

A. Remove spilled and excess materials adjacent to firestopping without damaging adjacent surfaces.

B. Leave finished work in a neat and clean condition with no evidence of spill overs or damage to adjacent surfaces.

3.06 IDENTIFICATION

A. Refer to section 27 05 53 for labeling details.

END OF SECTION

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SECTION 27-05-26
GROUNDING & BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Applicable requirements of Division 27 Communications shall be considered a part of this section and shall have the same force as if printed herein full.

B. This document describes the products and execution requirements relating to Grounding & Bonding for Communications Systems.

C. Product specifications, general design considerations, and installation guidelines are provided in this document. Locations of telecommunications equipment and typical installation details will be provided on Drawings as an attachment to this document. If the bid documents are in conflict, the Drawings shall take precedence. The successful vendor shall meet or exceed all requirements described in this document.

1.02 SUBMITTALS

A. Provide product data.

1.03 WORK INCLUDED

A. The work included under this Specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the technical specifications or not.

B. The work shall include, but not be limited to the following:
1. Furnish and install all Grounding Conductors.
2. Furnish and install all Grounding Lugs and Hardware.
3. Furnish and install all Grounding Busbars.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

A. Approved Equipment Grounding Conductor manufacturer(s):
1. Southwire
2. Or Approved Equal

B. Approved Grounding Lug manufacturer(s):
1. Burndy
2. Thomas & Betts
3. Or Approved Equal

C. Approved Grounding Busbar manufacturer(s):
1. Chatsworth Products, Inc.
2. B-Line

2.02 GROUNDING CONDUCTORS A.

Grounding Conductor

1. Construction shall be Type THHN copper conductors, insulated with heat and moisture resistant PVC over which a UL listed jacket is applied.
2. Jacket color shall be green or black. Black jacketed cable shall be identified at each termination point with a wrap of green tape.

2.03 GROUNDING LUGS

A. Grounding Lugs and Hardware
1. Grounding lugs shall be 2-hole and installed with a crimper that when properly executed the die of the cripmer impresses the die # on the lug base. All lugs shall be sleeved with clear heat-shrink to allow for inspection of the crimp. Silicon bronze or stainless steel bolts and washers shall be used to install lugs to equipment. Exothermic welding is also allowed.

2.04 GROUNDING BUSBARS

A. Grounding Busbar

1. The grounding busbar shall be made of 1/4" thick solid copper.
2. The grounding busbar shall be installed with minimum clearance, 1" offsets and 1-1/2" insulators.
3. The grounding busbar shall accommodate 2-hole compression lugs.
4. The grounding busbar shall meet or exceed J-STD-607-A requirements.

PART 3 - EXECUTION

3.01 GROUNDING

A. The facility shall be equipped with a Telecommunications Bonding Backbone (TBB). This backbone shall be used to ground all telecommunications cable shields, equipment, racks, cabinets, raceways, and other associated hardware that has the potential to act as a current carrying conductor. The TBB shall be installed independent of the building's electrical and building ground and shall be designed in accordance with the recommendations contained in the J-STD-607-A Telecommunications Bonding and Ground Standard.

B. The main entrance facility/equipment room in each building shall be equipped with a telecommunications main grounding busbar (TMGB). Each telecommunications room shall be provided with a telecommunications ground busbar (TGB). The TMGB shall be connected to the building electrical entrance grounding facility.

C. All racks, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, etc. entering or residing in the MC/IC/TC shall be grounded to the respective TGB or TMGB using a minimum #6 AWG stranded copper bonding conductor and compression lugs.

D. All wires used for telecommunications grounding purposes shall be identified with a green insulation. Non-insulated wires shall be identified at each termination point with a wrap or green tape. All cables and busbars shall be identified and labeled in accordance with the ANSI/TIA/EIA-606-A.

E. See Section 27 05 43 for underground duct and raceway systems ground requirements.

3.02 IDENTIFICATION

A. Refer to section 27 05 53 for labeling details.

END OF SECTION

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SECTION 27-05-28
PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Applicable requirements of Division 27 Communications shall be considered a part of this section and shall have the same force as if printed herein full.

B. This document describes the products and execution requirements relating to Pathways for Communications Systems.

C. Product specifications, general design considerations, and installation guidelines are provided in this document. Locations of interior telecommunications pathways and typical installation details will be provided on Drawings as an attachment to this document. If the bid documents are in conflict, the Drawings shall take precedence. The successful vendor shall meet or exceed all requirements described in this document.

1.02 SUBMITTALS

A. Provide product data.

1.03 WORK INCLUDED

A. The work included under this Specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the technical specifications or not.

B. The work shall include, but not be limited to the following:

1. Furnish and install complete Conduit System.
2. Furnish and install all Telecommunications Outlet Boxes.
3. Furnish and install all Pull Boxes.
4. Furnish and install complete Cable Tray System.
5. Furnish and install all Cable Hangers.
6. Furnish and install all Velcro Straps.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

A. Rigid/Intermediate Conduit manufacturer(s)
1. Allied
2. Triangle
3. Wheatland
4. Youngstown

B. Non-Metallic (PVC) manufacturer(s):
1. Carlon
2. Georgia Pipe Company
3. Or Approved Equal

C. Electrical Metallic Tubing (EMT) manufacturer(s):
1. Allied
2. Triangle
3. Wheatland
4. Youngstown

D. EMT Fittings manufacturer(s):
1. Thomas & Betts
2. Steel City
3. Or Approved Equal

G. Innerduct manufacturer(s):
1. Endot Industries Part Numbers 2" non-plenum – 1050
1-1/4" non-plenum – 1250
1" non-plenum – 2000
1-1/4 plenum – PL/1250

H.. Metallic Telecommunications Outlet Box manufacturer(s):
1. Steel City
2. Raco
3. Or Approved Equal

J. Pull Box manufacturer(s):
1. Hoffman
2. Or Approved Equal

K. Approved Cable Tray System manufacturer(s):
1. Flex Tray
2. Wiremold
3. EZ Tray
4. B-Line

L. Approved Cable Hanger manufacturer(s):
1. Erico Products – Caddy Part Numbers: J-Hook/Sling CABLECAT
Bridle Ring 4BRT-20
Bridle Ring Bracket 4-TIB

M. Approved Velcro Strap manufacturer(s):
1. Panduit
2. Or Approved Equal

2.02 CONDUIT

A. Rigid and Intermediate Conduit
1. Rigid conduit, intermediate conduit, couplings, locknuts, bushings, elbows and connectors shall be standard thread. All materials shall be steel. Set screw or non-threaded fittings are not permitted.

B. Non-Metallic (PVC) Conduit
1. Non-metallic conduit shall be heavy wall, Schedule 40 PVC.
2. Couplings and connectors for non-metallic conduit shall be of the same material and be the product of the same manufacturer of the conduit furnished.

C. Electrical Metallic Tubing (EMT)

1. Electrical metallic tubing (EMT), couplings and connectors shall be steel. Malleable iron, pressure-cast or die-cast fittings are not permitted.
2. Fittings for 2" EMT and smaller shall be steel set screw type, except where otherwise noted. Fittings for 2.5" and larger shall be steel set screw type with two (2) screws for connectors and four (4) screws for couplings. All connectors shall be insulated throat type.

D. Conduit Support

1. Individual conduit hangers shall be galvanized spring steel specifically designed for the purpose and sized appropriately for the conduit type and diameter. Support individual conduits 1-1/2 inch and smaller with 1/4 inch

threaded steel rods and use 3/8 inch rods for 2 inch and larger.

2. Conduit support channels shall be 14 gauge galvanized (or equivalent treatment) channel sized for the amount of conduit to be supported. Channel suspension shall be 3/8" threaded steel rods. Attach suspension rods to structure with swivel type connectors. Conduit straps shall be spring steel type compatible with channel.
3. Conduit straps shall be single hole cast metal type or two hole galvanized metal type. Conduit clamps shall be spring steel type for use with exposed structural steel.

E. Innerduct
1. Exposed innerduct shall be rated CMP (plenum), corrugated plastic equipped with pull-string or mule tape.
2. Sizes shall be 2", 1-1/4" & 1" inside diameter.
3. See Drawings for innerduct details.

2.03 METALLIC TELECOMMUNICATIONS OUTLET BOXES

A. Metallic outlet boxes and device covers shall be galvanized steel not less than 1/16" thick.

B. The dimensions of the metallic outlet box shall be 4" x 4" square with a minimum depth of 2-1/8".

C. Metallic outlet boxes shall be equipped with single device covers (or two-device covers where needed). Where installed in plaster, gypsum board, etc., covers shall be raised to compensate for the thickness of the wall finish.

D. Where metallic outlet boxes are to be empty for future use, blank coverplates shall be used.

2.05 PULL BOXES

A. Pull boxes shall be constructed of galvanized steel with flat, removable covers fastened with plated steel screws.

B. Pull boxes shall be equipped with keyhole screw slots in the cover to permit removal of the cover without extracting the screws.

C. Pull boxes shall have provisions for grounding.

2.06 CABLE TRAY

A. Cable Tray System

1. Cable tray shall be steel or aluminum construction.
2. Cable tray cross members shall be factory welded at 12" intervals maximum.
3. Cable tray shall be equipped with one (1) or two (2) support rails that run the length of each segment.
4. End caps shall be installed on the exposed ends of the cable tray, channel supports and bolts. Protective covers shall be installed on threaded rods that come in contact with cabling plant.
5. Wall mount cable tray used in limited clearance areas shall be hook style and constructed of aluminum.
6. See Drawings for cable tray dimensions. a.
   Cable Tray color shall be gray.

2.07 CABLE HANGERS

A. J-Hooks

1. J-hooks shall provide a bearing surface of sufficient width to comply with required bend radii of high-performance cables. J-hook shall be cULus Listed.
2. J-hooks shall have flared edges to prevent damage while installing cables.
3. J-hooks sized 1 5/16" and larger shall have a cable retainer strap to provide containment of cables within the hanger. The cable retainer strap shall be removable and reusable and be suitable for use in air handling spaces.

B. Adjustable Non-Continuous Cable Support Sling

1. Constructed from steel and woven laminate; sling length can be adjusted to hold up to 425, 4-pair, balanced twisted pair; rated for indoor use in non-corrosive environments. Rated to support Category 5e and higher cable, or optical fiber cable. Cable support sling shall be cULus Listed.
2. Adjustable non-continuous cable support sling shall have a static load limit of 100 lbs.
3. Adjustable non-continuous cable support sling shall be suitable for use in air handling spaces.

C. Bridle Rings

1. Bridle rings shall be made of steel, rated for indoor use in non-corrosive environments.

2. Bridle rings shall be UL listed.
3. Shall have an ultimate static load limit of 50 lbs. depending on application, select threaded, unthreaded or wood screw variety.

2.08 VELCRO STRAPS A.

Velcro Straps

1. Cables shall be fastened to support structures with Velcro straps.
2. Velcro straps installed in air handling spaces must be plenum rated.
   a.Plenum Velcro strap color shall be red.

PART 3 - EXECUTION

3.01 PENETRATIONS

A. Holes through concrete and masonry in new and existing structures shall be cut with a diamond core drill or concrete saw upon approval of the structural engineer of record for the base of building. Pneumatic hammer, impact electric, hand or manual hammer type drills shall not be allowed, except where permitted by the Project Manager as required by limited working space. X-ray all floor penetrations accordingly.

B. Holes shall be located so as not to affect structural sections such as ribs or beams.

C. Holes shall be laid out in advance. The Project Manager shall be advised prior to drilling through structural sections, for determination of proper layout.

D. Structural Penetrations: Where conduits, wireways and other raceways pass through fire partitions, fire walls or walls and floors provide a code compliant effective barrier against the spread of fire, smoke and gases.

E. All penetrations where continuous conduit is not used shall be sleeved with a section of EMT conduit of appropriate diameter to accommodate all cable and firestopping materials, and shall extend at least one inch beyond both sides of the penetration.

F. No gaps or rough edges shall be allowed between wall and conduit/sleeve.

3.02 CONDUIT SYSTEM

A. Conceal all conduits, except in unfinished spaces such as equipment rooms or as

indicated by symbol on the Drawings.

B. Leave all empty conduits with a 200 pound test nylon cord pull line.

C. Flattened, dented, or deformed conduits are not permitted and shall be removed and replaced.

D. Fasten conduit support device to structure with wood screws on wood, toggle bolts on hollow masonry, anchors as specified on solid masonry or concrete, and machine bolts, clamps, or spring steel clips, on steel.

E. Install conduit with wiring, including homeruns as indicated on the Drawings. Any change resulting in a savings in labor or materials is to be made only in accordance with a contract change. Deviations shall be made only where necessary to avoid interferences and when approved by Engineer by written authorization.

F. Conduit shall be run parallel or at right angles to existing walls, ceilings, and structural members.

G. Attach backbone conduits larger than one-inch trade diameter to or from structure on intervals not exceeding twelve feet with conduit beam clamps, one-hole conduit straps or trapeze type support.

H. Where conduits must pass through structural members obtain approval of Architect.

I. Install all conduits or sleeves penetrating or routed within rated firewalls or fire floors to maintain fire rating of wall or floor. Conduit shall not be installed in rated floors or walls if it compromises or violates the fire rating of floor or wall. Refer to architectural documents.

J. Provide expansion and deflection coupling where conduit passes over a building expansion joint.

K. Service entrance conduits and feeder conduits in direct contact with earth shall be schedule 40, heavy wall PVC. All service entrance conduit elbows shall be galvanized rigid steel. Service entrance conduits installed exposed or concealed in walls or above ceilings shall be galvanized rigid steel (G.R.S.) or intermediate metal conduit (IMC). Service entrance conduits shall be installed "outside" of the building as defined by the N.E.C. Provide concrete encasement where required or as indicated on Drawings.

L. All other conduit, unless specified herein, shall be electrical metallic tubing (EMT).

PVC conduit is not allowed in exposed or concealed areas, but only within concrete.

M. Conduit Installations Within Slab/Floor

1. Conduit shall be run following the most direct route between points.
2. Conduit shall not be installed in concrete where the outside diameter is larger than 1/3 of the slab thickness.
3. Conduits shall not be installed within shear walls unless specifically indicated on the Drawings. Conduit shall not be run directly below and parallel with load bearing walls.
4. Protect each metallic conduit installed in concrete slab or conduits 1-1/2 inch and smaller passing through a concrete slab against corrosion where conduit enters and leaves concrete by wrapping conduit with vinyl all-weather electrical tape.
5. Protect all conduits entering and leaving concrete floor slabs from physical damage during construction.
6. Provide expansion fittings in all conduits where length or run exceeds 200 feet or where conduits pass through building expansion joints.
7. Install all conduits penetrating or routed within rated fire floors to maintain the fire rating of the floor. Conduit shall not be installed in rated floors or walls if it compromises or violates the fire rating of floor or wall. Refer to architectural documents.
8. Conduits installed within concrete floor slabs which are in direct contact with grade or which penetrate the building roof shall be galvanized rigid steel (G.R.S.), intermediate metal conduit (I.M.C.) or Schedule 40, heavy wall PVC.

N. Telecommunications cables shall not occupy conduits with power cables. O.

Metallic conduits shall be grounded in accordance with J-STD-607-A.

P. For runs that total more than 100 feet in length, insert pull boxes so that no segment between boxes exceeds the 100 feet limit.

Q. Conduit runs shall not have more than two (2) 90-degree bends between pull points. R.

Telecommunications conduit system shall contain no condulets (also know as an LB).

S. Horizontal Conduits

1. Support horizontal conduits at intervals not exceeding ten feet and within three feet of each outlet, junction box, backboard, enclosure or cabinet. Support conduits

from structural steel members with spring steel type or beam conduit clamps and to non-metallic structural members with one-hole conduit straps. For exposed conduits and where conduits must be suspended below structure, single conduit runs shall be supported from structure by hanger rod and conduit clamp assembly, and multiple conduits shall be supported by trapeze type support suspended from structure. Do not attach conduits to ceiling suspension system channels or suspension wires.

2. Each horizontal home-run conduit can serve from one (1) to three (3) outlet

boxes. For one (1) outlet box, a 3/4" conduit shall be used, minimum. For two (2) outlet boxes, a 1" conduit shall be used, minimum. For three (3) outlet boxes, a 1-1/4" conduit shall be used, minimum.

3.03 TELECOMMUNICATIONS OUTLET BOXES

A. Exact locations of the outlet boxes shall be coordinated with the electrical contractor and other trades.

B. The approximate locations of the outlets are indicated on the Drawings. The exact locations shall be determined at the building. The right is reserved to change, without additional cost, the exact location of any outlet, a maximum of 10' before it is permanently installed.

C. Orientation of outlet boxes (horizontal or vertical) shall be as indicated on the architectural elevations.

D. Install all outlet boxes in finished areas flush with the wall. Maintain 1/4" or less space between outlet box front and finished wall surface.

E. Outlet boxes shall be firmly anchored in place and shall not depend on the coverplate to hold it secure to the wall.

F. Outlet boxes installed back-to-back in fire-rated walls shall be separated horizontally by a minimum of 24".

3.04 PULL BOXES

A. Pull boxes shall be secured, independent of the conduit entries into the box. Pull boxes shall be secured to the building structure. In ceiling applications, pull boxes shall not be supported with ceiling wires.

B. Conduits entering pull boxes shall connect to pull boxes using die-cast zinc connectors.

C. Pull boxes shall be free from burrs, dirt and debris.

D. Pull boxes shall be installed in accordance with ANSI/TIA/EIA-569-A. E.

Pull boxes shall be grounded in accordance with J-STD-607-A.

3.05 CABLE TRAY SYSTEM

A. Install trays in accordance with recognized industry practices, to ensure that the cable tray equipment complies with requirements of the NEC.

B. All open trays shall be installed a minimum of six (6) inches away from any light fixture.

C. Provide external grounding strap at expansion joints, sleeves, crossover and other locations where tray continuity is interrupted.

D. Support all pathways from building construction. Do not support pathways from ductwork, piping or equipment hangers.

E. Install cable tray level and straight.

F. Provide all hardware, accessories, fasteners, anchors, threaded rods and support channels required to provide a complete cable tray system.

G. Cable trays shall not be used to house both low voltage and power cables unless cables are separated by a grounded physical barrier.

H. Cable tray system shall be grounded in accordance with J-STD-607-A.

3.06 CABLE HANGERS

A. Installation and configuration shall conform to the requirements of the current revision levels of ANSI/ EIA/TIA Standards 568 & 569, NFPA 70 (National Electrical Code), applicable local codes, and to the manufacturer's installation instructions.

B. Install cables using techniques, practices, and methods that are consistent with Category 6 or higher requirements and that supports Category 6 or higher performance of completed and linked signal paths, end to end.

C. Install cables without damaging conductors, shield, or jacket.

D. Do not bend cables, in handling or in installing, to smaller radii than minimums recommended by manufacturer.

E. Pull cables without exceeding cable manufacturer's recommended pulling tensions. Use pulling means that will not damage media.

F. Do not exceed load ratings specified by manufacturer.

G. Adjustable non-continuous support sling shall have a static load limit of 100 lbs.

H. To avoid electromagnetic interference (EMI), pathways shall provide minimum clearances of four feet from motors or transformers, one foot from conduit and cables used for electrical power distribution, and five inches from fluorescent lighting. Pathways shall cross perpendicular to fluorescent lighting and electrical power cables or conduits.

I. Bridle rings shall be installed in ceiling spaces where cables cannot be supported by j-hooks.

3.07 VELCRO STRAPS

A. Velcro straps shall be installed around cables at intervals of 12" minimum. B.

Do not over-cinch cables.

3.08 SYSTEM FURNITURE FEEDS

A. Provide all system furniture feeds in accordance with construction Drawings. B.

Wall system furniture data/voice feeds

1. Data/voice system furniture feeds shall be installed next to the power feeds where possible, but shall be kept separate in the furniture raceway.
2. The wall feed shall consist of a double gang steel backbox in the wall. Two 1.5" conduits shall be routed from the double gang box inside the wall and stubbed up above the ceiling. The box shall be located at the same height as the power feed box, or centered at 6" A.F.F.
3. The backbox shall have a double-gang stainless steel cover plate with a 2" opening on the center to allow the cabling to exit the wall.
4. All cabling exiting the cover plate shall be routed inside a plastic or rubber whip, which must be no longer than 4 feet (i.e. the furniture feed must not be located more than 4 feet from the system furniture cable entrance).
5. The whip must be permanently attached to the wall cover plate, and no gap between the cover plate and the whip shall be visible from the outside. Similarly, the whip should go into the system furniture raceway without any visible gaps between the whip and the furniture, and it shall be permanently attached to the raceway.
6. No more than 10 Category 6 cables shall be routed via a system furniture

feed. Use additional system furniture feeds for additional cable capacity.

7. If the contractor installing the furniture feed system will not install the data/voice cabling at the same time, pull strings must be provided from the conduit in the ceiling in the backbox, whip, and to the system furniture outlet openings, as to allow easy installation of the cabling by theinstallers. If the Drawings do not indicate any data/voice outlets to be installed in the furniture, the contractor shall prepare at least two outlets in the furniture for future use (i.e. route the pull-strings, and leave two knockouts in the raceway free for use).
8. Contractor shall ensure that the cabling path from the ceiling to the conduits, backbox, whip, and furniture at all times maintains a 1" bend radius in accordance with TIA/EIA standards for Category 6 cables.

3.09 IDENTIFICATION *

A. Refer to section 27 05 53 for labeling details.

END OF SECTION

SECTION 27-05-53
IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Applicable requirements of Division 27 Communications shall be considered a part of this section and shall have the same force as if printed herein full.

B. This document describes the equipment and execution requirements relating to Identification for Communications Systems.

C. Equipment specifications, general considerations, and guidelines are provided in this document. If the bid documents are in conflict, the Drawings shall take precedence. The successful vendor shall meet or exceed all requirements described in this document.

1.02 SUBMITTALS

A. Provide the following submittals:

1. Product data
2. Product samples
3. Label sample showing example and text size for each item
4. Software program sample

1.03 WORK INCLUDED

A. The work included under this Specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete installation. The contractor will provide and install all of the required material whether specifically addressed in the technical specifications or not.

B. The work shall include, but not be limited to the following:
1. Perform all Labeling.

PART 2 - PRODUCTS

2.01 LABELS

A. All labels shall be vinyl.

B. All labels shall have an adhesive backing for permanent attachment.

C. All labels shall be of sufficient size. Minimum sizes shall be as follows:

1. 1-1/2"W x 3/16"H for:
   a. Outlets
   b. Outlet cables
   c. Patch panels
   d. Ground wires
   e. Backbone cable pairs
2. 4"W x 1"H for:
   a. Backbone cables
   b. Equipment racks
   c. MDF frames
   d. Active hardware and multiplexers

2.02 LABEL HOLDERS

A. Labels attached to backbone cable bundles shall be installed on a label holder of sufficient size. Label holder to be plastic and have tie wrapping provisions.

2.03 SOFTWARE PROGRAM

A. Software program shall be of the following types or similar:

1. PANDUIT labeling program
2. Brady labeling program
3. Thomas & Betts labeling program
4. Excel, customized

2.04 TEMPORARY LABELS

A. Vinyl labels, hand written, with permanent marker.

2.05 CHARTS

A. Provide printed charts containing required punch down and cross-connect information. Charts to be computer generated. File information shall be turned over to owner in printed and electronic format four (4) weeks prior to job completion.

2.06 AS-BUILT PLAN

A. Description: At the completion of the project, provide an "as-built" floor plan of each floor to the owner.

PART 3 – EXECUTION

3.01 LABELING REQUIREMENTS

A. Labeling shall be done in accordance with the recommendations made in the ANSI/TIA/EIA-606 document, manufacturer's recommendations and best industry practices.

B. All spaces, pathways, outlets, cables, termination hardware, grounding system and equipment shall be labeled with machine-generated labels.

C. All labels shall be clear with black text.

D. All cables shall be labeled with machine generated, wrap around labels.

E. A total of three (3) labels per horizontal cable are required at the following intervals: 6" from outlet; 18" from outlet' 12" from termination block/patch panel. F.

Labeling scheme shall be alphanumeric.

G. Provide and generate all labeling (no labels will be furnished by the owner). H.

Labels shall be developed and printed using a software program.

I. Software program and all in-puts shall be turned over to the owner at the end of the project.

3.02 INSTALLATION

A. All labels shall be installed straight.

B. Provide labels at locations as indicated on the Drawings and as follows:

1. Outlet face plates
2. Inside of outlet boxes
3. Outlet cable inside box
4. Outlet cable in ceiling above outlet
5. Outlet cables at poke through entrance on both sides
6. Outlet cable at rear of patch panel.
7. Port at rear of patch panel
8. Port on front of patch panel
9. Individual fiber strands at rear of patch panel
10. Backbone cables whenever exposed on minimum 10' intervals
11. Backbone cable at point of termination
12. LAN room and main telecommunications room (MR) punchdown blocks (Voice Outlet and Data Backbone blocks)
13. Ends of any cored cable put in place that is not terminated
14. On front of racks, cabinets frames, active hardware, multiplexers

3.03 LABELING SCHEME

A. In general the following items shall receive labeling:
   1. Outlets - (EX. Telecom room#. Patch panel #. Port #) or (EX. 139. 1- 3) 139 is the telecommunications room where the cable originates, 1 is the Patch panel #, and 3 is the third port on the patch panel.
   2. Outlet cables
   3. Backbone cables - (CVR=139) copper voice backbone to room 139, 1-25, 26-50,51-75, etc - 200)
   4. Patch panels - (ex. PP#1, PP#2, etc)
   5. Patch panel ports (each) - (EX. Office room #. Patch panel- Sequential port #) or (EX. 150. 1- 3) 150 is the office room number, 1 is the patch panel and 3 is the third port.
   6. Equipment racks and cabinets - (EX. Rack 1, rack 2, etc)
   7. Voice 110 LAN room blocks
   8. Data Backbone 110 blocks
   9. Ground wires
   10. Active hardware and multiplexers (by owner)

3.04 TEMPORARY LABELS

A. Provide temporary labels on all outlet cable as it is roughed-in. The bid documents will not show outlet/cable labeling at the time of the cable rough-in. Replace temporary labels with permanent labels after contract documents have been revised.

3.05 TEXT SIZE AND INFORMATION

A. Text size should be as large and as bold as possible.

B. Exact text required information is shown on the Drawings.

C. Refer to Drawings for all outlet, outlet cables, and backbone cables labels.

D. Refer to the Cover Drawing for exact labeling coding schemes, where applicable.

3.06 LABELING AND REFERENCE CHARTS

A. Contractor to provide a labeling reference chart(s) indicating the following:

   1. Voice backbone termination of pairs at the local telecommunication room (TR) and main telecommunications room (MR).
   2. Voice outlet cable pair termination at the TR.
   3. Data patch panel outlet port termination.

3.07 AS-BUILT PLAN & FRAME

A. Provide and mount frame with "as-built" on TR wall, PBX wall and File Server room wall near the data racks or voice blocks, or as indicated on the plans.

END OF SECTION

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SECTION 27-08-00
COMMISSIONING OF COMMUNICATIONS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Applicable requirements of Division 27 Communications shall be considered a part of this section and shall have the same force as if printed herein full.

B. This document describes the equipment and execution requirements relating to Commissioning of Communications.

C. Equipment specifications, general considerations, and guidelines are provided in this document. If the bid documents are in conflict, the Drawings shall take precedence. The successful vendor shall meet or exceed all requirements described in this document.

1.02 WORK INCLUDED

A. The work included under this Specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The contractor will provide and install all of the required material whether specifically addressed in the technical specifications or not.

B. The work shall include, but not be limited to the following:

1. Perform all Copper Cabling Testing.
2. Perform all Optical Fiber Cabling Testing.
3. Perform all Coaxial Cabling Testing.
4. Provide all Documentation, As-Builts, Training and Warranty.

PART 2 - TESTING

2.01 TESTING REQUIREMENTS

A. General

1. All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA-568-C.2 All pairs/strands of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors/strands in all cables

installed.

B. Copper Testing

1. All twisted-pair copper cable links shall be tested for continuity, pair reversals, shorts, opens and performance as indicated below. Additional testing is required to verify Category 6 performance. Horizontal balanced twisted pair cabling shall be tested using a level III test unit for category 6 compliance and performance up to 350 MHz.
2. Continuity - Each pair of each installed cable shall be tested using a test unit that shows opens, shorts, polarity and pair-reversals, crossed pairs and split pairs. The test shall be recorded as pass/fail as indicated by the test unit and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.
3. Length - Each installed cable link shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the ANSI/TIA-568-C.2 Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number. For multi-pair cables, the shortest pair length shall be recorded as the length for the cable.

C. Fiber Testing

1. All fiber testing shall be performed on all fibers in the completed end-to-end system.There shall be no splices unless clearly defined in the RFP and/or Drawings. These tests also include continuity checking of each fiber.
2. Test set-up and performance shall be conducted in accordance with ANSI/TIA/EIA-526-7 and/or ANSI/TIA/EIA-526-14 Standards, and to the manufacturer's application guides.
3. Attenuation testing shall be performed with a stable launch condition using two-meter jumpers to attach the test equipment to the cable plant. The light source shall be left in place after calibration and the power meter moved to the far end to take measurements.
4. Multimode
   a. Test the optical fiber cable bi-directionally with an OTDR and uni-directionally with a power meter / light source. Fiber must be tested at both 850nm and 1300nm. Maximum attenuation dB/Km @ 850nm/1300nm shall be 3.5/1.5. Maximum attenuation per connector pair shall be .75 dB.
5. Singlemode
   a. Test the optical fiber cable bi-directionally with an OTDR and uni-directionally with a power meter / light source. Fiber must be tested at both 1310nm and 1550nm. Maximum attenuation dB/Km @ 1310nm/1550nm shall be 0.5/0.5 for outside plant and 1.0/1.0 for inside plant. Maximum attenuation per connector pair shall be .75 dB.

D. Coaxial Testing

1. Sweep testing of each reel of coaxial cable shall be performed over the 5 MHz through 1 GHz range by the cable manufacturer for transmission and structural return loss and be so certified in writing by the cable manufacturer.
2. Signal level at each outlet shall be +5 dBmv, + 3 dB; applies only if contractor's scope of work includes implementing video distribution system.
3. Standard for signal strength measurement shall be a calibrated field strength meter; applies only if contractor's scope of work includes implementing video distribution system.

E. Test Results

1. Test documentation shall be provided on disk as part of the as-built package. The disk shall be clearly marked on the outside front cover with the words "Project Test Documentation", the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair (or strand) and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.
2. The field test equipment shall meet therequirements of ANSI/TIA/EIA-568-C.2.
3. Printouts generated for each cable by the wire (or fiber) test instrument shall be submitted as part of the documentation package. Alternately, the contractor may furnish this information in electronic form (3.5" diskette or CD). These diskettes or CDs shall contain the electronic equivalent of the test results as defined by the bid specification and be of a format readable from Microsoft Word.
4. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

PART 3 - DOCUMENTATION, AS-BUILTS, TRAINING AND RECORDS

3.01 DOCUMENTATION & AS-BUILTS

A. As-Built record documentation for telecommunications work shall include:

Cable routing and identification
System function diagrams
Manufacturers' description literature for equipment
Connection and programming schedules as appropriate
Equipment material list including quantities

Spare parts list with quantities
Details not on original Contract Documents
Test Results
Warranties
Release of
Liens

B. The Contractor shall provide and maintain at the site a set of prints on which shall be accurately shown the actual installation of all work under this section, indicating any variation from contract Drawings, including changes in pathways, sizes, locations and dimensions. All changes shall be clearly and completely indicated as the work progresses.

C. Progress prints shall be available for inspection by the Owner or any of his representatives and may be used to determine the progress of Telecommunications infrastructure work.

D. At the completion of the work, prepare a new set of as-built drawings, of the work as actually noted on the marked-up prints, including the dimensioned location of all pathways.

E. Furnish as-built drawings and documentation to the Project Manager. As-built drawings shall be generated in AutoCad 2002 or later. Submit as-built drawings electronically on C.D. and hard copy.

3.02 OPERATIONS AND MAINTENANCE MANUAL

A After completion of the work, the Contractor shall furnish and deliver to the Engineer three (3) copies of a complete Operations & Maintenance Manual. A system wiring diagram shall be furnished for each separate system.

B. The manual shall be subdivided into separate sections with tab dividers to identify subsystems of the integrated system. Reference appropriate specification sections.

C. Provide the following additional information for each electronic system. Information shall beedited for this project where applicable.

1. Operations manuals for components and for systems as a whole.
2. Maintenance manuals for components and for system as a whole.
3. Point-to-point diagrams, cabling diagrams, construction details and cabling labeling details.
4. List of spare parts, materials and suppliers of components. Provide name, address and telephone number for each supplier.
5. Emergency instructions for operational and maintenance requirements.
6. Delivery time frame for replacement of component parts from suppliers.
7. Recommended inspection schedule and procedures for components and for system as a whole.
8. List of spare parts, materials and suppliers of components. Provide name,

addressand telephone number for each supplier.

9. Complete "Reviewed" shop drawings and product data for components and system as a whole.
10. Troubleshooting procedures for each system and for each major system component.

3.03 TRAINING

A. The Contractor shall be responsible for training of facility personnel. Training shall take place after occupancy and before acceptance and shall include programs for on-site operations and maintenance of technology and communications systems. Training shall be for not more than ten (10) people, shall be held at the Owner's site and shall be of sufficient duration and depth to ensure that the trained personnel can operate the installed systems and can perform usual and customary maintenance actions.

3.04 WARRANTY

A. General
1. All equipment is to be new and warranted free of faulty workmanship and damage.
2. Replacement of defective equipment and materials and repair of faulty workmanshipwithin 24 hours of notification, except emergency conditions (system failures), which must be placed back in service within eight (8) hours of notification, all at no cost to the owner.
3. The minimum warranty provisions specified shall not diminish the terms of individual equipment manufacturer's warranties.

B. Voice & Data Structured Cabling

1. Manufacturer(s) shall provide a 25-year warranty for components used in the installed Voice & Data Structured Cabling System. Defective and/or improperly installed products shall be replaced and/or correctly installed at no cost to the Owner.

C. CATV Infrastructure
1. Manufacturer(s) shall provide a 1-year warranty for components used in the installed CATV Infrastructure. Defective and/or improperly installed products shall be replaced and/or correctly installed at no cost to the Owner.

D. Pathway & Support Infrastructure

1. Manufacturer(s) shall provide a 1-year warranty for components used in the installed Pathway & Support Infrastructure. Defective and/or improperly installed products shall be replaced and/or correctly installed at no cost to the Owner.

END OF SECTION

Section 27-11-19

Communications Terminations, Blocks, and Patch Panels

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes the products and specification requirements for Telecommunications Rooms (TR) Blocks and Patch Panels

B. Product specifications, general design considerations, and installation guidelines are provided in this document. Locations of telecommunications equipment and typical installation details will be provided on Drawings as an attachment to this document. If the bid documents are in conflict, the Drawings shall take precedence. The successful vendor shall meet or exceed all requirements described in this document.

1.2 RELATED DOCUMENTS

A. This Section shall be used in conjunction with the following other specifications and related Contract Documents to establish the total general requirements for the project communications systems and equipment:

A. Section 27-00-00 - Structured Cabling General Requirements
B. Section 27-05-10 - Fire stopping
C. Section 27-05-26 – Grounding and Bonding for Communications Systems
D. Section 27-05-28 – Pathways for Communications Systems
E. Section 27-05-43 - Underground Ducts and Raceways
F. Section 27-05-53 - Identification
G. Section 27-08-00 - Commissioning
H. Section 27-11-13 – Entrance Protection
I. Section 27-11-16 – Cabinets Racks and Enclosures
J. Section 27-11-23 – Cable Management and Ladder Racking
K. Section 27-11-26 – Rack Mounted Power Strips
L. Section 27-13-13 – Copper Backbone Cabling
M. Section 27-13-23 – Optical Fiber Backbone Cabling
N. Section 27-13-33 – Coaxial Backbone Cabling
O. Section 27-15-00 - Copper Horizontal Cabling
P. Section 27-15-43 – Faceplates and Connectors
Q. Section 27-60-60 – CATV Distribution Equipment

1.3 REFERENCES

A. All work shall be performed in accordance with the following codes and industry standards, unless noted otherwise:

A. NFPA 70 – National Electrical Code, current version adopted by local or State AHJ.

B. TIA-568-C.2 – Commercial Building Telecommunications Cabling Standard, current version.
C. TIA/EIA-569-B – Commercial Building Standard for Telecommunications Pathways and Spaces, current version.
D. TIA/EIA-606-A – Administration Standard for Commercial Telecommunications Infrastructure, current version.
E. J-STD-607-A – Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications, current version.
F. IEEE 241 - IEEE Recommended Practice for Electric Power Systems in Commercial Buildings" pertaining to communication systems.

1.4 SYSTEM DESCRIPTION

A. This section describes the acceptable products, procedures and best practices for the installation of Communications blocks and Patch Panels.

B. Telecommunications contractor shall furnish and install all materials necessary for a complete and working system.

1.5 WARRANTY

A. The Telecommunications contractor must be an approved Ortronics Certified Contractor at a Plus tier (CIP, CIP-Gold, CIP-Platinum, or multi-site/national) and Oasis certified. The Telecommunications contractor is responsible for workmanship and installation practices in accordance with the Ortronics Certified Installer Program (CIP). The certified contractor shall have 30% of their technicians trained on copper & fiber installations and testing by Ortronics; they also shall have at least 1 project manager successfully complete an Ortronics 2-Day Management Certification class, and Berk-Tek Oasis training program. Ortronics/Berk-Tek will extend a NetClear 25-year Static, Dynamic and Applications Warranty to the end user.

B. Telecommunications contractor shall provide labor, materials and documentation according to Ortronics requirements necessary to insure that the Owner will be furnished with a NetClear Warranty of 25 years in length.

C. All necessary documentation for warranty registration must be provided to Ortronics and Georgia State University Information Systems and Technology Group and will be furnished by the Telecommunications Contractor immediately following 100% testing of all cables. All test results shall be submitted to Ortronics and Georgia State University Information Systems and Technology Group in the certification tester's original software on CD.

D. Telecommunications Contractor shall administer the warranty process with

the responsible manufacturer's representative. The warranty shall be provided directly to the owner from the manufacturer. Telecommunications contractor shall insure that the manufacturer provides the Owner (Georgia State University Information Systems and Technology Group), with the appropriate warranty certification within 30 calendar days of the final project completion.

PART 2 - PRODUCTS

2.1 APPROVALS AND SUBSTITUTIONS

A. All products shall be provided as specified, without exception, unless approved in writing by Georgia State University Information Systems and Technology Group prior to the bid.

B. Non-compliant products installed as a part of this Contract shall be removed and replaced and all costs for removal and replacement shall be borne solely by the Contractor(s).

C. All products shall be "NEW".

2.2 APPROVED PRODUCTS

A. Approved 48 Port Category 6 Unshielded Twisted Pair Patch Panel
1. Manufacturer: Ortronics
a. Part Number: OR-PHD66U48

B. Approved 48 Port Category 6 SFTP Shielded Twisted Pair Patch Panel
1. Manufacturer: Blackbox
a. Part Number: JPS60A-24

C. Approved 2 Slot, Optical Fiber Enclosure, Rack Mounted
1. Manufacturer: Corning
a. Part Number: CCH-01U
b. Multi-Mode Fiber Insert Panel, 12 Port SC Connector i. Part Number: CCH-CP12-E7 for OM3/OM4
c. Single-Mode Fiber Insert Panel, 6 Port SC Connector i. Part Number CCH-CP12-59 for SM

D. Approved 12 Slot Port, Optical Fiber Enclosure, Rack Mounted
1. Manufacturer: Corning
a. Part Number: CCH-04U
b. Multi-Mode Fiber Insert Panel, 6 Port SC Connector i. Part Number: CCH-CP12-E7 for OM3/OM4
c. Single-Mode Fiber Insert Panel, 6 Port SC Connector i. Part Number CCH-CP12-59 for SM

E. Approved 144 Port, Optical Fiber Enclosure, Rack Mounted
1. Manufacturer ADC/Tyco Electronics

a. Left Side:
i. Part Number: NGF-TB4MLU7 or Equivalent
Pre-Terminated ADC
Unit. b. Right Side:
i. Part Number: NGF-TB1MRU7 or Equivalent
Pre-terminated ADC unit.
c. Single-Mode Fiber Insert Panel,

F. Approved Wall-Mounted S110 Field Termination Kits
1. Manufacturer: Siemon
a. 50-pair, S110 wiring block with legs
1. Part Number: S110AW1-50
b. 100-pair, S110 wiring block with legs
1. Part Number: S110AW2-100
c. 200-pair, S110 wiring block with legs
1. Part Number: S110AW2-200
d. 300-pair, S110 wiring block with legs
1. Part Number: S110AW2-300

G. Approved Wall –Mounted S110 Horizontal Cable Managers
1. Manufacturer: Siemon
a. 1 RMS Wire manager with Legs
1. Part Number: S110A1RMS

3.0 EXECUTION

1. Category 6 patch panel terminations shall be compliant with ANSI/TIA 568-C.2.0 stand- ards, and manufacturer recommendations.

2. Fiber optic patch panel terminations shall be compliant with ANSI/TIA 568-C.3.0 standards, and manufacturer recommendations.

3. Unless exact location is specified in the drawing set, Contractor shall coordinate the placement of all patch panels with the owner. Georgia State University Information Systems and Technologies.

4. Unless exact location is specified in the drawing set, the contractor shall coordinate the placement of all Category 6 patch panels with the owner. Georgia State University Information Systems and Technologies.

3.2 Category 6 Patch Panels

A. General
1. Category 6 Patch Panes shall be compliant with ANSI/TIA 568-C.2.0 standards and manufacturers recommendations.
2. Category 6 Patch Panels Shall be compatible with 19" Telco racks, 19"

ISO
equipment cabinets, or wall mount brackets.
3. The Category 6 patch panel shall be equipped with 8-position modular ports and shall be terminated using a T568B wiring scheme.
4. Unless exact placement of the Category 6 Patch Panel is specified in the drawing sets, the contractor shall coordinate the placement of the Patch Panels with the owner, Georgia State University Information Systems and Technologies.

B. 48-Port, Category 6 Unshielded Twisted Pair Patch Panels
1. Category 6 unshielded twisted pair patch panel shall be compliant with ANSI/TIA
568-C.2.0 standards.
unshielded cables.

C. 48-Port Category 6 Shielded Twisted Pair Patch Panels
1. The Category 6 Shielded twisted pair patch panel shall be compliant with ANSI/TIA
568-C.2.0 standards.
2. Category 6 Shielded twisted pair patch panels shall only be used to terminate
Category 6 SFTP cables.

3.3 Fiber Optic Patch Panels

A. General
1. Fiber optic patch panel terminations shall be compliant with ANSI/TIA 568-C.3.0 standards, and manufacturer recommendations.
2. Unless exact placement of Fiber Optic Patch Panels is specified in the drawing sets, the contractor shall coordinate the placement of the patch panel with the owner, Georgia State University Information Systems and Technologies.

B. Lo ∨ Density 2 Slot Optical Fiber Termination Panel
a. The 2 Slot Optical Fiber Termination Panel shall be compatible with 19" Telco

equipment Racks, 19" Equipment Cabinets and wall mount brackets.

b. The 2 Slot Optical Fiber Patch Panels shall be used in all communications closets that have more than 12 or less fiber terminations.
c. The 2 Slot Optical Fiber Termination Panels shall use SC terminations for multi-mode.
d. The 2 Slot Optical Fiber Termination Panels shall use SC Ultra Polished terminations for Single-mode terminations.

C. Medium Density 12 Slot Optical Fiber Termination Panel
   a. The 1 2 Slot Optical Fiber Termination Panel shall be compatible with 19" Telco equipment Racks, 19" Equipment Cabinets and wall mount brackets.
   b. The 1 2 Slot Optical Fiber Patch Panels shall be used in all communications closets that have more than 12 and less than 432 fiber terminations.
   c. The 12 Slot Optical Fiber Termination Panels shall use SC terminations for multi- mode applications.
   d. The 12 Slot Optical Fiber Termination Panels shall use SC Ultra

Polished terminations for Single-mode fiber installations.

D. High Density 144-Port Optical Fiber Termination Panel
   a. The 144 Port Optical Fiber Termination Panel shall be compatible with ADC NGF- MDF7A100-30 Fiber Distribution Frame.
   b. The 144 Port Optical Fiber Termination Panels shall be used in all communications closets that have more than 432 fiber terminations in a specific location.
   c. The 144 Port Optical Fiber Termination Panel shall use LC Ultra polished connectors for Single-Mode fiber terminations.

3.4 S110 Wall Mount Field Termination Units

A. Wall Mount Field Termination Units shall be mounted in a level horizontal position.
B. Wall Mount Field Termination Units shall have approved horizontal cable managers installed on top and bottom of all units.
   installed in all applicable positions.
D. Wall Mount Field Termination Units shall have cable labeling strips installed on all units.
E. Wall Mount Field Termination Units shall be mounted no lower than 2' from the ground.
F. Unless specified on the drawings, the location for mounting of Wall Mount S110 Field Termination Units shall be coordinated with the owner, Information Systems and Technology.

END OF SECTION

SECTION 27-11-23
COMMUNICATIONS CABLE MANAGEMENT & LADDER RACKS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Applicable requirements of Division 27 Communications shall be considered a part of this section and shall have the same force as if printed herein full.

B. This document describes the products and execution requirements relating to Communications Cable Management & Ladder Rack.

C. Product specifications, general design considerations, and installation guidelines are provided in this document. Locations of telecommunications equipment and typical installation details will be provided on Drawings as an attachment to this document. If the bid documents are in conflict, the Drawings shall take precedence. The successful vendor shall meet or exceed all requirements described in this document.

1.02 SUBMITTALS

A. Product data.

1.03 WORK INCLUDED

A. The work included under this Specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the technical specifications or not.

B. The work shall include, but not be limited to the following:

1. Furnish and install all Horizontal Cable Management.
2. Furnish and install all Vertical Cable Management.
3. Furnish and install Ladder Rack System.
4. Furnish and install all Velcro Straps.
5. Furnish and install all C-Rings/D-rings.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

A. Approved Horizontal Cable Management manufacturer(s):

1. Optical Cable Corp (OCC) Part Number: COMB3519

B. Approved Vertical Cable Management manufacturer(s):

1. Chatsworth Products, Inc. Part Number: 11729-503

C. Approved Ladder Rack System manufacturer(s):

1. Chatsworth Products, Inc.
2. B-Line

D. Approved Velcro Strap manufacturer(s):

1. Panduit

E. Approved C-Ring/D-ring manufacturer(s):

1. Siemon Part Number: S144

2.02 CABLE MANAGEMENT - HORIZONTAL A.

Horizontal Cable Management

1. The horizontal wire manager shall be compatible with 19-inch equipment racks and cabinets.
2. The horizontal cable manager shall provide support for patch cords at the front of the panel.
3. The horizontal wire manager shall be equipped with management fingers and covers.
4. The horizontal cable manager shall be 2 rack-units in height.

2.03 CABLE MANAGEMENT - VERTICAL A.

Vertical Cable Management

1. The vertical cable manger shall be double-sided.
2. The vertical cable manager shall provide support for patch cords at the front of the rack and wire management at the rear of the rack.
3. The vertical cable manager shall be a minimum width of 6". a.
   Vertical Cable Manager color shall be gray.

2.04 LADDER RACKS

A. Ladder Rack System
   1. See Drawings for ladder rack system details.
   2. The ladder rack system shall be securely mounted with hardware designed for use in ladder rack systems.
   3. End caps shall be installed on the exposed ends of the ladder racks, channel supports and bolts. Protective covers shall be installed on threaded rods that come in contact with cabling plant.
      a. Ladder Rack System color shall be gray.

2.05 VELCRO STRAPS A.

Velcro Straps

1. All cables shall be fastened to support structures with Velcro straps. a.
   Velcro Strap color shall be black.

2.06 C-RINGS/D-RINGS

A. C-Rings/D-rings
   1. C-rings/D-rings shall be used on backboards to support cables, patch cords and cross-connect wire.
   2. C-rings/D-rings shall be made of high-strength, fire-retardant material with rounded edges to prevent damage to cable and wire insulation.

2.07 LADDER RACK DROP-OUT SHIELD A.

Ladder Rack Drop-Out Shield

1. Ladder rack drop-out shield used to protect cables as they are routed from ladder rack to equipment rack shall be custom made by Star Sheet Metal (214) 438-5056.

PART 3 - EXECUTION

3.01 CABLE MANAGEMENT - HORIZONTAL

A. Horizontal cable managers shall be installed below patch panels in a 1:1 ratio (one horizontal cable manager per patch panel) or as indicated on Drawings.

3.02 CABLE MANAGEMENT - VERTICAL

A. Vertical cable managers shall be installed on both sides of a single equipment rack. Where two (2) or more racks are positioned in a row, vertical cable managers shall be installed between each rack and each end of the row.

3.03 LADDER RACKS

A. Ladder rack system shall be installed straight, level and perpendicular to walls and ceiling slabs.

B. Ladder racks shall be supported at 5' intervals maximum.

C. Provide all hardware, accessories, fasteners, anchors, threaded rods and support channels required to provide a complete ladder rack system.

D. See Drawings for ladder rack system details.

3.04 VELCRO STRAPS

A. Velcro straps shall be installed around cables at intervals of 12" minimum. B.

Do not over-cinch cables.

3.05 C-RINGS/D-RINGS

A. C-ring/D-rings shall be installed on 3/4" backboard, straight and level.

3.06 LADDER RACK DROP-OUT SHIELD

A. Install in ladder rack above equipment racks to support cables as they are routed from

the ladder rack to the equipment rack.

3.07 IDENTIFICATION

A. Refer to section 27 05 53 for labeling details.

END OF SECTION

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Section 27-15-00
Communications Horizontal Cabling

PART 1 - GENERAL

1.1 SUMMARY

A. Horizontal (distribution) communications wiring and connecting hardware from the Telecommunications Room (TR) to Telecommunication Outlets (TO) throughout the site.

1.2 RELATED DOCUMENTS

A. This Section shall be used in conjunction with the following other specifications and related Contract Documents to establish the total general requirements for the project communications systems and equipment:

A. Section 27-00-00 - Structured Cabling General Requirements
B. Section 27-05-10 - Fire stopping
C. Section 27-05-26 – Grounding and Bonding for Communications Systems
D. Section 27-05-28 – Pathways for Communications Systems
E. Section 27-05-43 - Underground Ducts and Raceways
F. Section 27-05-53 - Identification
G. Section 27-08-00 - Commissioning
H. Section 27-11-13 – Entrance Protection
I. Section 27-11-16 – Cabinets Racks and Enclosures
J. Section 27-11-19 – Termination Blocks and Patch Panels
K. Section 27-11-23 – Cable Management and Ladder Racking
L. Section 27-11-26 – Rack Mounted Power Strips
M. Section 27-13-13 – Copper Backbone Cabling
N. Section 27-13-23 – Optical Fiber Backbone Cabling
O. Section 27-13-33 – Coaxial Backbone Cabling
P. Section 27-15-43 – Faceplates and Connectors
Q. Section 27-60-60 – CATV Distribution Equipment

1.3 REFERENCES

A. All work shall be performed in accordance with the following codes and industry standards, unless noted otherwise:

A. NFPA 70 – National Electrical Code, current version adopted by local or State AHJ.
B. TIA-568-C.2 – Commercial Building Telecommunications Cabling Standard, current version.
C. TIA/EIA-569-B – Commercial Building Standard for Telecommunications Pathways and Spaces, current version.
D. TIA/EIA-606-A – Administration Standard for Commercial Telecommunications Infrastructure, current version.

E. J-STD-607-A – Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications, current version.
F. IEEE 241 - IEEE Recommended Practice for Electric Power Systems in Commercial Buildings" pertaining to communication systems.

1.4 SYSTEM DESCRIPTION

A. The horizontal distribution subsystem refers to all intra-building twisted-pair and fiber optic communications cabling connecting Telecommunication Rooms (TR's) to telecommunication outlets (TO's) located at individual work areas.

B. Horizontal cabling may consist of a combination of the following types of cable from the TR to the TO:

A. Category 6 (100 Ohm, 4-pair, unshielded twisted pair) cables from the TR's to the TO's.)
B. Category 6 (100 Ohm, 4 pair, shielded, twisted pair) cables from the TR's to the TO's.)

C. The Horizontal System includes cables, jacks, patch panels, connecting blocks, patch cords, fiber connectors and jumpers as well as the necessary support systems, such as cable managers and faceplates.

D. Cables shall be routed through conduit, cable trays, spaces below raised floors, open ceiling areas, non-ventilated spaces above ceiling tile, and through plenum air-handling spaces above ceiling tile. Coordinate with General Contractor (GC).

E. Cables shall not be attached to ceiling grid, fire sprinkler systems, duct work, o or lighting fixture supports or cables. Where support is required the contractor shall install appropriate support systems as prescribed in ANSI/TIA-568.C.2.

F. Cables shall be installed in continuous lengths from origin to destination point. There shall be no splices.

G. Horizontal cables shall not be bundled in groups of more than 50 cables.

H. A plastic or nylon pull cord with a minimum test rating of 90 Kg (200 Lbs) shall be installed with any cable installed in conduits. A pull cord is not required for conduit sleeves, of less than 4' in length.

I. Contractor shall leave a minimum of 12" of slack for twisted pair out the outlet end. This slack shall be neatly coiled in the wall, termination box, or modular furniture raceway. Where there is insufficient space in the wall, termination box, or modular furniture raceway, the required slack may be left loosely coiled in the ceiling area.

J. Each cable shall be clearly labeled on the cable jacket behind the termination device at each location.

K. Telecommunications contractor shall furnish and install all materials necessary for a complete and working system.

1.5 WARRANTY

A. The Telecommunications contractor must be an approved Ortronics Certified Contractor at a Plus tier (CIP, CIP-Gold, CIP-Platinum, or multi-site/national) and Oasis certified. The Telecommunications contractor is responsible for workmanship and installation practices in accordance with the Ortronics Certified Installer Program (CIP). The certified contractor shall have 30% of their technicians trained on copper & fiber installations and testing by Ortronics; they also shall have at least 1 project manager successfully complete an Ortronics 2-Day Management Certification class, and Berk-Tek Oasis training program. Ortronics/Berk-Tek will extend a NetClear 25-year Static, Dynamic and Applications Warranty to the end user.

B. Telecommunications contractor shall provide labor, materials and documentation according to Ortronics requirements necessary to insure that the Owner will be furnished with a NetClear Warranty of 25 years in length.

C. All necessary documentation for warranty registration must be provided to Ortronics and Georgia State University Information Systems and Technology Group and will be furnished by the Telecommunications Contractor immediately following 100% testing of all cables. All test results shall be submitted to Ortronics and Georgia State University Information Systems and Technology Group in the certification tester's original software on CD.

D. Telecommunications Contractor shall administer the warranty process with the responsible manufacturer's representative. The warranty shall be provided directly to the owner from the manufacturer. Telecommunications contractor shall insure that the manufacturer provides the Owner (Georgia State University Information Systems and Technology Group), with the appropriate warranty certification within 30 calendar days of the final project completion.

PART 2 - PRODUCTS

2.1 APPROVALS AND SUBSTITUTIONS

A. All products shall be provided as specified, without exception, unless approved in writing by Georgia State University Information Systems and Technology Group prior to the bid.

B. Non-compliant products installed as a part of this Contract shall be removed and replaced and all costs for removal and replacement shall be borne solely by the Contractor(s).

C. All products shall be "NEW".

2.2 STATION CABLING

A. Approved Copper Station Cable Manufacturer(s):
1. Berk-Tek
2. Belden
3. CommScope
4. Mohawk
5. Superior-Esse

2.3 ACCEPTABLE STATION CABLING TYPES

A. Category 6 unshielded twisted pair
a. 100 ohm, Category 6, 23AWG, 4-pair unshielded twisted pair, CMP rated, color blue.
b. The horizontal balanced twisted pair cable shall meet or exceed the Category 6 transmission characteristics per ANSI/TIA-568-C.2.

B. Category 6 shielded twisted pair
a. 100 ohm, Category 6 SFTP, 23 AWG, 4-pair shielded twisted pair, CMPrated, color gray
b. The horizontal balanced twisted pair cable shall meet or exceed the Category 6 transmission characteristics per ANSI/TIA-568-C.2.
c. Where drawings identify that cable is to be used for AV Transport, Belden 1352A shall be installed, no exceptions.

3.0 EXECUTION

1. Cable shall be installed in accordance with manufacturer's recommendations and best industry practices.

2. A plastic or nylon pull cord with a minimum test rating of 90 Kg (200 lb.) shall be co-installed with all cable installed in any conduit.

3. Cable raceways shall not be filled greater than the ANSI/TIA/EIA-569-A maximum fill for the particular raceway type.

4. Cables shall be installed in continuous lengths from origin to destination (no splices).

5. The cable's minimum bend radius and maximum pulling tension shall not be exceeded. Refer to manufacturer's requirements.

6. If a J-hook or trapeze system is used to support cable bundles all horizontal cables shall be supported at a maximum of 48 to 60 inch (1.2 to 1.5 meter) intervals. At no point shall cable(s) rest on acoustic ceiling grids or panels.

7. Horizontal distribution cables shall be bundled in groups of no more than 50 cables.

8. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.

9. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, the Contractor shall install appropriate carriers to support the cabling.

10. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the Contractor prior to final acceptance at no cost to the Owner.

11. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA-568-C.2 document, manufacturer's recommendations and best industry practices.

12. Leave a minimum of 12" of slack for twisted pair cables at the outlet. Cables shall be coiled in the in-wall box, surface-mount box or modular furniture raceway if adequate space is present to house the cable coil without exceeding the manufacturers bend radius. Excess slack shall be loosely coiled and stored in the ceiling above each drop location when there is not enough space present in the outlet box to store slack cable.

13. Cables shall be neatly bundled and dressed to their respective termination device. Each terminating device shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.

14. Each cable shall be clearly labeled on the cable jacket behind the termination device at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

3.1 IDENTIFICATION

A. Refer to Section 27 05 53 - Identification for Communications Systems for labeling details.

END OF SECTION

Section 27-15-43

Communications Faceplates & Connectors

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Applicable requirements of Division 27 Communications shall be considered a part of this section and shall have the same force as if printed herein full.

B. This document describes the products and execution requirements relating to Communications Faceplates & Connectors.

C. Product specifications, general design considerations, and installation guidelines are provided in this document. Locations of horizontal cabling and typical installation details will be provided on Drawings as an attachment to this document. If the bid documents are in conflict, the Drawings shall take precedence. The successful vendor shall meet or exceed all requirements described in this document.

1.02 RELATED DOCUMENTS

A. This Section shall be used in conjunction with the following other specifications and related Contract Documents to establish the total general requirements for the project communications systems and equipment:

A. Section 27-00-00 - Structured Cabling General Requirements
B. Section 27-05-10 - Fire stopping
C. Section 27-05-26 – Grounding and Bonding for Communications Systems
D. Section 27-05-28 – Pathways for Communications Systems
E. Section 27-05-43 - Underground Ducts and Raceways
F. Section 27-05-53 - Identification
G. Section 27-08-00 - Commissioning
H. Section 27-11-13 – Entrance Protection
I. Section 27-11-16 – Cabinets Racks and Enclosures
J. Section 27-11-19 – Termination Blocks and Patch Panels
K. Section 27-11-23 – Cable Management and Ladder Racking
L. Section 27-11-26 – Rack Mounted Power Strips
M. Section 27-13-13 – Copper Backbone Cabling
N. Section 27-13-23 – Optical Fiber Backbone Cabling
O. Section 27-13-33 – Coaxial Backbone Cabling
P. Section 27-15-00 – Communications Horizontal Cabling
Q. Section 27-60-60 – CATV Distribution Equipment

1.03 SUBMITTALS

A. Provide the following submittals:

1. Product data
2. Sample of each outlet correctly configured.

1.04 WORK INCLUDED

A. The work included under this Specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the technical specifications or not.

B. The work shall include, but not be limited to the following:

1. Furnish and install all Copper Connectivity.
2. Furnish and install all Coaxial Connectivity.
3. Furnish and install all Faceplates.
4. Furnish and install all Surface Mount Boxes.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

A. Approved Single-Gang Faceplate for In-Wall and Surface-Mount Installations:

1. Manufacturer: Ortronics
2. Faceplate: Series II .5" Deep Part Number: OR-40300158
3. Faceplate: Series II .75 Deep Part Number: OR-40300011
4. Color: Fog White

B. Approved Dual-Gang Faceplate for In-Wall and Surface-Mount Installations:

1. Manufacturer: Ortronics
2. Faceplate: Series II Part Number: OR-40300159
3: Color: Fog White

C. Approved Modular Furniture Faceplate:

1. Manufacturer: Ortronics
2. Faceplate: Series II Part Number: OR-40300167-09
3. Color: Fog White

D. Approved Faceplate Blanking Modules

1. Manufacturer: Ortronics
2. Module: Series II .5U Height Part Number: OR-40300144
3. Module: Series II 1U Height Part Number: OR-40300164
4. Color: Fog White

E: Approved Single-Gang Surface Mount Box for Faceplate Installation:

1 Manufacturer: Ortronics
2 Unit: Series II 1.5" Depth Part Number: OR-40300061
3 Unit: Series II 2.0" Depth Part Number: OR-40300185
4 Color: Fog White

F: Approved Dual-Gang Surface Mount Box for Faceplate Installation:

1. Manufacturer; Ortronics
2. Unit: Ortronics Series II Part Number: OR-40300186
3. Color: Fog White

G: Approved Category 6 Unshielded Cable, Faceplate Module:

1. Manufacturer: Ortronics
2. Single-Port Module: Series II Part Number: OR-S21600
3. Dual-Port Module: Series II Part Number: OR-S22600
4. Color: Fog White

H. Approved Category 6 Shielded Cable, Faceplate Module:

1. Manufacturer: Ortronics
2. Module: Series II Dual Bezel for Track Jack
   Part Number: OR-40300749
   *Note: Part number is for quantity 10, adjust quantity as needed.
3. Insert: Track Jack Cat 6 Shielded Part Number: OR-TJS600
4. Color: Fog White

I. Approved RG6 BNC Connector Coaxial Faceplate Insert:

1: Manufacturer: Ortronics
2: Insert: Series II BNC Single Gang Part Number: OR-60900018
3: Insert: Series II BNC Dual Gang Part Number: OR-60900019
4: Color: Fog White

J: Approved RG6 BNC Style Cable Connectors:

1. RG6 Cable BNC Compression Connectors:
2. Manufacturer: Corning Gilbert Part Number: GABNC161HS342H
3. Manufacturer: PPC Part Number: PPC-EX6

K: Approved RG6 F Connector Coaxial Faceplate Insert

1: Manufacturer: Ortronics
2: Insert: Series II F Connector F/F Part Number: OR-60900017
3: Color: Fog White

L: Approved RG6 Cable F Compression Connectors:

1:	Manufacturer: Corning Gilbert	Part Number: GF6AHS322
2:	Manufacturer: PPC	Part Number: PPC-EX6XL

2.02 COPPER CONNECTIVITY

A. Communications Module

1. The communications module shall feature two (2) category 6, 8-position, 8-contact modular jacks.
   a. The connector module shall be designed for use at the Work Area, Telecommunications Room and/or Equipment Room without modification.
   b. Each jack shall be T568B wiring configuration.
   c. Each jack shall have an insulation displacement connection featuring insulation slicing of 22 to 24 AWG plastic-insulated solid copper conductors forming a gas-tight connection.
   d. Provide colored icons to indicate voice and data ports. e. Module color shall be fog white.
   f. Icon colors shall be:
      1) blue data for both jacks.

2.03 COAXIAL CONNECTIVITY

A. Connectors shall be solderless, 75-Ohm impedance and be designed for the specific type of cable used.

B. Series-6 connectors shall be one piece.

C. All Series-6 connections shall be made with compression-type connectors.

D. Screw-on connectors are not acceptable.

E. The coaxial adapter module that occupies the faceplate shall be a 75-ohm, BNC-type connector.

2.04 FACEPLATES

A. Faceplates

1. The faceplate housing the connector modules shall have no visible mounting screws.
2. It shall be possible to install the connector modules in wall-mounted single- gang electrical boxes, utility poles and modular furniture (cubicle) access points using manufacturer-supplied faceplates and/or adapters.
3. The faceplate housing the connector modules shall have the option of being mounted on adapter boxes for surface mount installation.

4. The faceplate housing the connector modules shall have a labeling capability using built-in labeling windows to facilitate outlet identification and ease network management.
5. The faceplate housing the connector modules shall provide flexibility in configuring multimedia workstation outlets that respond to present of future network needs.
6. Color shall be fog white.

B. Blank Insert:

1. Color shall be fog white.

2.05 SURFACE MOUNT BOXES

A. The surface mount box shall accommodate voice, data and video connections.

B. The surface mount box shall have internal storage space for slack cabling and a built-in spool for controlling cable bend radius.

C. Color shall be fog white.

PART 3 - EXECUTION

3.01 COPPER CONNECTIVITY

A. 8-position, 8-contact modular jacks shall be installed in accordance with manufacturer's recommendations and installation guides, and best industry practices.

B. Pair untwist at the termination shall not exceed 13 mm (0.5 inch).

3.02 COAXIAL CONNECTIVITY

A. BNC-connectors shall be installed in accordance with manufacturer's recommendations and installation guides, and best industry practices.

B. Cable connector application shall only be done using a manufacturer approved gas- less compression crimping tool.

3.03 FACEPLATES

A. Blank inserts shall be installed where ports are not used.

B. The same orientation and positioning of jacks and connectors shall be utilized through out the installation.

C. Faceplates shall be installed straight and level.

D. Faceplates shall be installed at heights as noted on the Drawings.

3.04 SURFACE MOUNT BOXES

A. Blank inserts shall be installed where ports are not used.

B. The same orientation and positioning of jacks and connectors shall be utilized through out the installation.

C. Surface mount boxes shall be installed straight and level.

D. Surface mount shall be installed at heights as noted on the Drawings.

3.05 IDENTIFICATION

A. Refer to section 27 05 53 for labeling details.

END OF SECTION

SECTION 280500 GENERAL ELECTRONIC SAFETY REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. The Drawings are schematic and are not intended to show the exact location of devices, etc. or the routing of conduit or cable.

B. Dimensions and information regarding accurate locations of equipment, and structural limitations and finish shall be coordinated and verified with other Divisions of Work. Be prepared to provide dimensions and information regarding the Work of this Division to other trades.

C. The right is reserved to relocate any device a maximum of 10'-0" before it is permanently installed without incurring additional cost to the Contract.

1.02 REFERENCE STANDARDS

A. All work shall comply with the most recently revised versions of all local, state and federal codes, ordinances of the authority having jurisdiction, laws, rules and regulations. Any modifications required by any of the above shall be made without any additional cost to the owner. Where requirements between governing Codes and Regulations vary, the more restrictive provision shall apply.

B. Nothing contained in the Contract Documents shall be construed as authority or permission to disregard legal requirements and regulations. The Contractor shall thoroughly review the Documents and bring any such conflicts to the attention of the Architect and Engineer prior to Installation.

C. All materials shall be new and shall bear the label of U.L.

1.03 EXISTING CONDITIONS

A. Where work is to be performed in an existing facility, the contractor shall visit the site prior to bid and be familiar with all existing conditions. Special attention shall be given to work to be performed above an existing ceiling.

B. Where existing slabs are to be cut or core drilled, the contractor shall x-ray the existing slabs to avoid cutting or disrupting existing conduits, cables, plumbing or structural members.

C. The electrical service to the building shall not be interrupted without written consent of the building owner.

D. No allowance will be made for lack of knowledge of existing conditions.

E. At the completion of the project, all work under this Division shall be completely integrated with the existing systems and left in perfect operating condition.

F. Where work under this Division disrupts the continuity of any existing to remain circuit or feeder, the Contractor shall repair/replace as necessary to return to a perfectly functional and safe operating condition.

G. Prior to any demolition or construction the Contractor shall have the existing conditions inspected by an EPA, OSHA certified asbestos abatement agency to identify the presence of asbestos. Should any asbestos be found it shall be brought to the immediate attention of the Architect and Owner and specifically identified in writing.

1.04 DEFINITIONS

A. Provide: to furnish, install and connect.

B. Furnish: to supply all materials, labor, equipment, testing apparatus, controls, tests, accessories and all other items customarily required for the proper and complete application.

C. Install: to join, unite, fasten, link, attach, set-up or connect together, complete, tested, and ready for normal satisfactory operation.

D. Engineer: the Engineer of record.

E. Contract Documents: the complete set of Specifications and Drawings of all Divisions.

F. Work: labor, materials, equipment, accessories, controls and other items required for a complete installation.

G. Concealed: embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces or in enclosures.

H. Conduit: rigid steel; intermediate metal conduit (IMC), plastic conduit (PVC), electrical metallic tubing (EMT), or flexible steel conduit.

I. Exposed: not installed underground or concealed.

J. Equal: equal in quality, workmanship, materials, weight, size, design and efficiency of the specified product, conforming to manufacturers.

K. Supply: to purchase, procure, acquire and deliver complete with related accessories.

L. Authority Having Jurisdiction (AHJ): applicable local, state and federal authorities having jurisdiction over any part of the Scope within this Division and other Divisions.

1.05 SHOP DRAWINGS AND PRODUCT DATA

A. The Contractor shall obtain complete shop drawings, product data and samples from the manufacturers, suppliers, vendors, and all Division 16 Subcontractors, for all materials and equipment as specified herein in various Sections of the Specifications, and shall submit data and details of such materials and equipment for review by the Architect and Engineer. Prior to submission of the shop drawings, product data and samples to the Architect and Engineer, the Contractor shall thoroughly review the shop drawings, product data and samples and certify they are in compliance with the Contract Drawings. Further, the Contractor shall check all materials and equipment upon their arrival on the Project site and verify their condition and compliance with the Contract Documents. Any Work which proceeds prior to receiving reviewed shop drawings shall be modified as required to comply with the Contract Documents and the shop drawings. A minimum period of ten (10) working days, exclusive of transmittal time, will be required in the Engineer's office each time a shop drawing, product data and/or sample is submitted or resubmitted for review. This time period shall be considered by the Contractor when scheduling his Work. The initial shop drawing review for equipment and materials may be expedited through the mutual consent of the Contractor, Architect, Engineer, and Owner providing the Contractor agrees to submit complete, certified, documented, and coordinated shop drawings for review in accordance with the requirements of the Contract Documents.

B. The review of shop drawings, product data, and samples by the Architect and Engineer shall not relieve the Contractor of the responsibility for dimensions or errors that may be contained therein, or for deviations from requirements in the Contract Documents. Is shall be clearly understood that the noting of some errors by the Engineer but overlooking others does not grant the Contractor permission to proceed in error.

C. All shop drawings and product data/submittals shall be submitted in compliance with the requirements of the general and supplementary conditions. No more than four (4) copies of submittal data will be reviewed. Any additional copies will be returned unmarked. The responsibility of copying review comments on any additional copies will rest solely with the contractor.

D. All product data/submittals shall bear the name of the manufacturer to be used.

E. All shop drawings and submittals shall include a stamped indication signifying that the submittal has been reviewed for compliance with the Contract Documents by the Contractor. This stamped indication also represents the fact that the Contractor has checked this submittal for its interaction with all other Divisions and certifies by his signature or initials that all coordination has taken place. The stamp shall include the date, name of the Contracting Firm, the signature of the Contractor, certification of compliance and approval. This stamp shall be on the submittal before the Engineer will review it.

F. The engineer will review an individual submittal not more than twice. If the submittal is rejected again on the second review, the contractor will bare all responsibility for paying for the Engineer's time for additional reviews. Such payments to the engineer shall be withheld from the next monthly pay application.

G. Shop drawings and/or product data shall be submitted for the following for review:

1. Switchboards, panelboards, transformers, busway, motor control centers, ground fault system and other equipment associated with the main distribution.
2. Disconnect switches, fuses, motor starters.
3. Life Safety System.
4. Lighting fixtures, lighting control system, dimming system, emergency batteries and other equipment associated with lighting.
5. Transient voltage surge protection.
6. Generator, UPS, transfer switches, batteries, static switches, transition switches, switchgear and other equipment associated with emergency and/or standby back-up power systems.
7. Devices, receptacles, switches, coverplates, motion sensors. The product data shall include the manufacturers name, model number, size and color.
8. Conduit, wire, boxes, fittings.

H. Shop drawing shall be submitted as one complete package for all systems. Shop drawing will not be reviewed until all systems are provided to engineer.

1.06 AS-BUILT DRAWINGS

A. The Contractor shall maintain on a daily basis at the Project site a complete set of "Record Drawings". Project Record Documents shall be maintained as specified in Division 01.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer's names and catalog numbers specified in the Contract Documents are intended to describe the material and set the standard of quality. All bids shall be based on material specified. Request for approval of material not specified shall be considered if the request is in written form and submitted to the Architect no later than fourteen (14) days prior to the bid date. All requests shall conform with the provisions of the general and supplementary conditions.

B. When specific names are not stated, only the best available quality of material or equipment shall be submitted for review and used in the installation.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The equipment selections used in the preparation of the Contract Documents will fit into the physical spaces provided and indicated, allowing ample room for access, servicing, removal and replacement of parts, etc. Adequate space shall be allowed for clearance in accordance with the Code requirements and the requirements of the local Authorities having jurisdiction, and the equipment manufacturer's recommendations.

B. In the preparation of Drawings, a reasonable effort to accommodate acceptable equipment manufacturer's space requirements has been made. However, since space requirements and equipment arrangement vary according to each manufacturer, the responsibility for initial access, maintenance access, code required access, and proper fit rests with the Contractor.

C. Physical dimensions and arrangements of equipment to be installed shall be subject to the Architect's and Engineer's review.

D. No conduit or cable shall be installed in the eight (8) inch high zone directly above the ceiling in tenant areas to allow for tenant build-out and flexibility unless otherwise specifically shown on the Drawings or prior written authorization is received from the Engineer.

E. Accessibility and Clearance:
1. Equipment, junction and pull boxes shall be installed in accessible locations, avoiding obstructions, preserving headroom, and keeping openings and passageways clear.
2. Minor adjustments in the locations of equipment shall be made where necessary, providing such adjustments do not adversely affect functionality of the equipment.

F. Scaffolds and staging for installation of electrical work shall be provided under the work of this Division.

3.02 STRUCTURAL FITTINGS

A. Provide the necessary sleeves, inserts, hangers, anchor bolts, and related structural items. Install at the proper time.

B. Openings may have been indicated on the Architectural and Structural drawings. Should any additional openings or holes be required, the same shall be provided at no additional cost to the Owner.

C. Location: At a time in advance of the work, verify openings shown on the Architectural and Structural drawings, and coordinate any additional openings.

D. If the work of this Section requires modification of the Architectural or Structural drawings, Provide new instructions as to requirements for these openings. Submit for review and coordination to Architect.

E. Sleeves shall be supplied for electrical conduits passing through walls or slabs and shall be placed before concrete is poured.

F. Supports shall be fastened to the structure by inserts, anchor bolts, bolting to drilled and tapped structural members, or be welding to the structure.
1. Welding shall be done by the electric arc method with fully competent welders. Supporting members shall be shop coated with a suitable primer.

2. Surfaces damaged by installation of supports shall be touched up with primer to match shop coat. Any drilling of structural members shall be approved by the Architect.

G. Flashing:
1. Wherever conduits pass through the roof or outer walls, base flashing and counterflashing shall be provided.
2. Such flashing shall be properly installed by skilled workmen, and shall include grouting, mastic or tar application, or other means to insure a permanent, waterproof, neat and workmanlike installation.
3. Insofar as possible, flashing shall comply with and be similar to requirements for flashing in General Construction Work.

H. Anchor bolts and inserts shall be galvanized and of adequate size and strength for installation of electrical work and shall be placed in forms before concrete is poured.
1. Placement of bolts in bases shall be done under other Division. Provide detail drawings, templates, and anchor bolts for bases to the General Contractor in time to avoid delaying work schedules.
2. Expansion shields shall only be used with specific approval of the Architect. Wooden or soft metal plugs shall not be used.

I. Cutting and patching:
1. All additional cutting, patching and reinforcement of construction of building, subject to review by the Architect, shall be performed under this Section.
2. Refer to appropriate Division for requirements.

3.03 WEATHERPROOF EQUIPMENT

A. Electrical devices or equipment located in damp, semi-exposed areas shall be weather-resistant. Enclosures shall comply with NEMA Type 3R requirements.

B. Surface mounted outlet boxes shall be cast metal with threaded bolts. Pull or junction boxes shall be cast metal with bolted and gasketed covers.

C. Outlet box covers shall be of a suitable weatherproof type with gaskets, packing glands, weatherproof doors, or other required means to prevent entry of moisture.

D. Lighting fixtures shall be installed with suitable gasket, and UL labeled for location.

3.04 CLEANING

A. Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.

B. Painted exposed work soiled or damaged: Clean and repair to match adjoining work before final acceptance.

C. Remove dust and debris from inside and outside of material and equipment.

3.05 WARRANTIES

A. The warranty period for all systems, equipment, components, work, etc. shall be no less than one (1) year, unless specified otherwise hereinafter and shall include at least one (1) full heating season and one (1) full cooling season.

B. The Contractor shall, without cost to the Owner, remedy any defects within a reasonable time to be specified in notice from the Architect. In default thereof, the Owner may have such work done and charge all costs to the Contractor.

C. The start of the Contractor's warranty period, as defined in the General Conditions, shall commence on the issue of a "Certificate of Substantial Completion", by the Owner or the Owner's Representative for each item of material, equipment or system.

D. The Subcontractor shall confer with the General Contractor prior to the bid date concerning the project schedule and determine if there is a need to operate any items of equipment or systems for temporary heating an/or cooling or other reasons prior to "Substantial Completion". All required extended warranty costs for equipment, materials, and systems shall be included in the Subcontractor's bid.

END OF SECTION

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SECTION 283100 LIFE SAFETY SYSTEM – LO RISE

PART 1 - GENERAL

1.01 SUMMARY

A. This performance specification provides the minimum requirements for the Life Safety System. The system shall include, but not limited to all equipment, materials, labor, documentation and services necessary to provide and install a complete, operational system to include but not limited to the following functions:
   1. Smoke and fire detection.
   2. Sprinkler suppression system monitoring and control.
   3. Off-premise notification
   4. Provide duct smoke detectors or in-duct smoke detectors as applicable for all smoke damper locations. Coordinate quantity and locations with the mechanical drawings. Provide 120V power supply to each smoke damper.
   5. Monitoring of back flow preventers and PIV valves as indicated on the Civil Drawings.

B. Drawings are diagrammatic. The devices shown on the plans are for general architectural and owner coordination and shall be considered a minimum; additional devices shall be provided as required as part of this contract. The contractor shall provide all components, devices, and connections necessary to provide a complete and operating system as required by NFPA and the authority having jurisdiction. The contractor shall coordinate with all trades and provide the necessary devices, connections and zone required (included, but not exclusive, duct mounted smoke detectors, sprinkler system flow and tamper switches, HVAC controls, elevator controls, etc.) Provide quantity of audio/visual devices and power supplies as required by NFPA and the authority having jurisdiction.

1.02 MANUFACTURER

A. The manufacturer of the system equipment shall be regularly involved in the design, manufacture, and distribution of all products specified in this document. These processes shall be monitored under a quality assurance program that meets the ISO 9000 requirements.

B. All System components shall be the cataloged products of a single supplier. All products shall be listed by the manufacturer for their intended purpose.

C. Edwards Systems Technology, Inc. products constitute the minimum type and quality of equipment to be installed. Acceptable alternate manufacturers and panels are as follows: Notifier AM 2020, Pyrotronics MXLV.

D. All control panel assemblies and connected field appliances shall be both designed and manufactured by the same company, and shall be tested and cross-listed as to ensure that a fully functioning system is designed and installed. The system supplied under this specification shall be a microprocessor-based, system. The system shall utilize

independently addressed, microprocessor-based smoke detectors, heat detectors, and modules as described in this specification.

1.03 ALTERNATES

A. Strict conformance to this specification is required to ensure that the installed and programmed system will function as designed, and will accommodate the future requirements and operations of the building Owner. All specified operational features must be met without exception.

B. All equipment and components shall be the manufacturer's current model and all equipment shall be by the same manufacturer. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling system, access control, and smoke control. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.

C. Any other equipment considered equivalent must be submitted to the Engineer of record not less than ten (10) calendar days prior to the bid, for approval. Submitting of material does not constitute acceptance or approval of said equipment. All deviations from the specification must be listed in a point-by-point statement showing compliance or non-compliance with the specifications. The acceptability of any alternate proposed system shall be the sole decision of the Engineer, Owner or his authorized representative.

1.04 REFERENCES

A. General (references)
1. All work and materials shall conform to all applicable Federal, State and local codes and regulations governing the installation. If there is a conflict between the referenced standards, federal, state or local codes, and this specification, it is the bidder's responsibility to immediately bring the conflict to the attention of the Engineer for resolution. National standards shall prevail unless local codes are more stringent. The bidder shall not attempt to resolve conflicts directly with the local authorities unless specifically authorized by the Engineer.
2. System components proposed in this specification shall be UL listed to operate together as a system. The supplier shall provide evidence, with his submittal, of listings of all proposed equipment and combinations of equipment. The supplier shall be responsible for filing of all documents, paying all fees (including, but not limited to plan checking and permit) and securing all permits, inspections and approvals. Upon receipt of approved drawings from the authority having jurisdiction, the supplier shall immediately forward two sets of drawings to the Owner. These drawings shall either be stamped approved or a copy of the letter stating approval shall be included.

B. Codes
1. Fire - The equipment and installation shall comply with the current provisions of the following codes and standards:
a. NFPA 70 - 2005 National Electric Code®
b. NFPA 72 - 2013 National Fire Alarm Code®

c. NFPA 90A - 1999 Air Conditioning Systems
d. NFPA 101- 2000 Life Safety Code®
e. UL 864 - Control Units for Fire Protective Signaling Systems.
f. UL 268 - Smoke Detectors for Fire Protective Signaling Systems.
g. UL 268A - Smoke Detectors for Duct Applications.
h. UL 521 - Heat Detectors for Fire Protective Signaling Systems.
i. UL 228 - Door Closers-Holders, With or Without Integral Smoke Detectors.
j. UL 464 - Audible Signaling Appliances.
k. UL 38 - Manually Actuated Signaling Boxes for Use with Fire-Protective Signaling Systems
l. UL 346 - Waterflow Indicators for Fire Protective Signaling Systems.
m. UL 1971 - Signaling Devices for the Hearing-Impaired.
n. UL 1481 - Power Supplies for Fire Protective Signaling Systems.
o. Factory Mutual (FM) approval
p. AHJ
q. Federal Codes and Regulations
r. Americans with Disabilities Act (ADA)

1.05 SYSTEM DESCRIPTION

A. General

The Contractor shall provide all labor, services and materials necessary to furnish and install a complete, functional fire alarm system (System). The System shall comply in all respects with all pertinent codes, rules, regulations and laws of the Authority, and local jurisdiction. The System shall comply in all respects with the requirements of the specifications, manufacturer's recommendations and Underwriters Laboratories Inc. (ULI) listings.

B. System Features

1. Provide and install a new fire detection and alarm system that shall consist of:
   a. Fire Alarm Control Panel.
   b. LCD remote annunciator(s).
   c. Printer.
   d. Manual pull stations, smoke detectors, heat detectors, beam detectors and duct detectors.
   e. Sprinkler system waterflow(s) and valve supervisory switch(s).
   f. Interface with suppression system(s).
   g. Audio/visual devices.
   h. Synchronized visual notification appliances.
   i. Magnetic door holders (coordinate with Architect and door hardware).
2. Provide elevator recall functions for primary and alternate floors and elevator power shunt trip activation.
3. Provide connection to a central station. The owner shall arrange for two dedicated phone lines to be terminated as directed by the installing contractor.

C. Sequence of Operations

1. The alarm activation of any area smoke detector, heat detector, manual pull station, sprinkler waterflow, the following functions shall automatically occur:
   a. The internal audible device shall sound at the control panel and remote

annunciator.

b. The LCD display shall indicate all applicable information associated with the alarm condition including; device type, device location and time/date.
c. All system activity/events shall be documented in system history and on the system printer.
d. Any remote or local annunciator LCD/LED's associated with the alarm shall be illuminated.
e. Activate notification audible appliances throughout the building or as required by code.
f. Activate visual strobes notification appliances throughout the building or as required by code. The visual strobe shall continue to flash until the system has been reset. The visual strobe shall not stop operating when the "Alarm Silence" is pressed.
g. Transmit an alarm signal to the central station.
h. All automatic events programmed to the alarm point shall be executed and the associated outputs activated.
i. All stairwell/exit doors shall unlock throughout the building.
j. All self-closing fire/smoke doors held open shall be released.

2. The Alarm activation of any duct smoke detector, the following functions shall automatically occur:
   a. The internal audible device shall sound at the control panel and remote annunciator.
   b. The LCD display shall indicate all applicable information associated with the alarm condition including; device type, device location and time/date.
   c. All system activity/events shall be recorded on the system printer and system history file.
   d. Any remote or local annunciator LED's associated with the alarm shall be illuminated.
   e. Transmit signals to remote annunciators located as shown on the contract drawings.
   f. Transmit an alarm signal to the central station.
   g. Shutdown the local air handling unit.
   h. All automatic events programmed to the alarm point shall be executed and the associated outputs activated.
3. Upon supervisory activation of any sprinkler valve supervisory switch, the following functions shall automatically occur:
   a. The internal audible device shall sound at the control panel and remote annunciator.
   b. The LCD display shall indicate all applicable information associated with the supervisory condition including; device type, device location and time/date.
   c. All system activity/events shall be documented on the system printer and system history file.
   d. Any remote or local annunciator LCD/LED's associated with the supervisory activation shall be illuminated.
   e. Transmit a supervisory signal to the central station.

4. Upon activation of a trouble condition or signal from any device on the system,

the following functions shall automatically occur:

a. The internal audible device shall sound at the control panel and remote annunciator.
b. The LCD display shall indicate all applicable information associated with the trouble condition including; device type, device location and time/date.
c. All system activity/events shall be documented on the system printer and system history file.
d. Any remote or local annunciator LCD/LED's associated with the trouble zone shall be illuminated.
e. Transmit a trouble signal to the central station.

D. System Configuration

1. General
   a. All Life Safety System equipment shall be arranged and programmed to provide a system for the early detection of fire, the notification of building occupants, the automatic summoning of the local fire department, the override of the HVAC system operation, and the activation of other auxiliary systems to inhibit the spread of smoke and fire, and to facilitate the safe evacuation of building occupants.
   b. The System shall utilize independently addressed, smoke detectors, heat detectors and input/output modules as described elsewhere in this specification.
2. Power Supply
   a. The power supply shall be a high efficiency switch mode type with line monitoring to automatically switch to batteries for power failure or brown out conditions. The automatic battery charger shall have low battery discharge protection. The power supply shall provide internal power and 24 Vdc at 6.0A continuous for notification appliance circuits. All outputs shall be power limited. The battery shall be sized to support the system for 60 hours of supervisory and trouble signal current plus general alarm for 15 minutes. The power supply shall be an EST model 2-PPS6/A.
   b. Auxiliary power supplies shall be a high efficiency switch mode type with line monitoring to automatically switch to batteries for power failure or brown out conditions. The automatic battery charger shall have low battery discharge protection. The power supply shall provide internal power and 24 Vdc at 6.4 continuous for notification appliance circuits. The power supply shall be capable of providing 8A to output circuits for a maximum period of 100 ms. All outputs shall be power limited. The battery shall be sized to support the system for 60 hours of supervisory and trouble signal current plus general alarm for 30 minutes. All supervision of the auxiliary supply shall be transmitted via addressable analog loop without additional equipment. The auxiliary power supply shall be an EST model SIGA-APS.
3. Display
   a. The display module shall be of membrane style construction with a 4 line by 20 characters Liquid Crystal Display. The LCD shall use super-twist technology and backlighting for high contrast visual clarity. In the normal mode display the time, the total number of active events and the

total number of disable points. In the alarm mode display the total number of events and the type of event on display. Reserve 40 characters of display space for user custom messages. The module shall have visual indicators for the following common control functions; AC Power, alarm, supervisory, monitor, trouble, disable, ground fault, CPU fail, and test. There shall be common control keys and visual indicators for; reset, alarm silence, trouble silence, drill, and one custom programmable key/indicator. Provide four pairs of display control keys for selection of event display by type (alarm, supervisory, monitor and trouble) and forward / backward scrolling through event listings. The operation of these keys shall be integrated with the related common control indicator that lights when an event of its type is active. Allow the first event of the highest priority to capture the LCD for display so that arriving fire fighters can view the first alarm event "hands free". Provide system function keys; status, reports, enable, disable, activate, restore, program, and test. The module shall have a numeric keypad, zero through nine with delete and enter keys.

b. The display module shall be an EST model 2-LCD.

4. Initiating Device Circuits
   a. The Initiating device circuits (IDC) used to monitor waterflow switches, valve supervisory switches, fire pump functions, and air pressure supervisory switches shall be Class B.
   b. The Initiating device circuits shall be EST Signature series modules.
5. 24 VDC Notification Appliance Circuits
   a. 24 VDC Notification appliance circuits (NAC) shall be Class B. All notification appliance circuits shall have a minimum circuit output rating of 2 amp @ 24 vdc. The notification circuits shall be power limited. Non-power limited circuits are not acceptable.
   b. The 24 VDC Notification appliance circuits shall be EST Signature series modules.
6. Audio Notification Appliance Circuits
   a. One-way audio notification appliance circuits (NAC) shall Class B. All notification appliance circuits shall have a minimum circuit output rating of 35W @70Vrms. The notification circuits shall be power limited. Non-power limited circuits are not acceptable.
   b. The one-way audio notification appliance circuits shall be EST Signature series modules.
7. Signaling Line Circuits
   a. The signaling line circuit shall communicate from a panel/node to analog/addressable detectors, input modules, output modules, isolation modules and notification appliance circuits.
   b. Each signaling circuit connected to addressable/analog devices shall provide a minimum of 20 spare addresses.
   c. When a signaling line circuit covers more than one fire/smoke compartments, a wire-to-wire short shall not effect the operation of the circuit from the other fire/smoke compartments.
   d. The signaling line circuit (SLC) connecting panels and annunciators shall be Class B.
   e. The signaling line circuit connecting to addressable/analog devices including, detectors, monitor modules, control modules, isolation

modules, and notification circuit modules shall be Class B.

8. DACT
   a. The panel shall have a dialer (alarm communicator transmitter (DACT)) module to transmit alarm, supervisory and trouble signals to a Central Monitoring Station (CMS). The DACT shall support dual telephones lines, 20 PPS 4/2 communications, and configured for dual tone multi-frequency (DTMF) or pulse modes. It shall be possible to delay AC power failure reports, auto test call, and site program using a touch tone phone and password.
   b. The dialer shall be an EST model DL2.

E. Submittals
   1. Project Submittal
      a. The contractor shall purchase no equipment for the system specified herein until the owner has approved the project submittals in their entirety and has returned them to the contractor. It is the responsibility of the contractor to meet the entire intent and functional performance detailed in these specifications. Approved submittals shall only allow the contractor to proceed with the installation and shall not be construed to mean that the contractor has satisfied the requirements of these specifications. The contractor shall submit ten (10) complete sets of documentation including point to point CAD drawings and submittals within 30 calendar days after award of purchase order.
      b. Each submittal shall include a cover letter providing a list of each variation that the submittal may have from the requirements of the contract documents. In addition the contractor shall provide specific notation on each shop drawing, sample, catalog cut, data sheet, installation manual, etc. submitted for review and approval, of each such variation.
      c. All drawings and diagrams shall include the Contractor's title block, complete with drawing title, contractor's name, address, date including revisions, and preparer's and reviewer's initials.
      d. Product Data - Data sheets with the printed logo or trademark of the manufacturer for all equipment. Indicated in the documentation will be the type, size, rating, style, and catalog number for all items proposed to meet the system performance detailed in this specification. The proposed equipment shall be subject to the approval of the Architect/Engineer.
      e. Shop Drawings - A complete set of shop drawings shall be supplied. The shop drawings shall be reproduced electronically in digital format. This package shall include but not be limited to:
         1) Control panel wiring and interconnection schematics.
         2) Complete point to point wiring diagrams. A vertical riser is not acceptable. All drawings must be in CAD.
         3) Detailed system operational description and operational matrix.
         4) Complete system bill of material.
      f. All drawings shall be reviewed and signed off by an individual having a minimum of a NICET III certification in fire protection engineering technology, subfield of fire alarm systems.
   2. Qualifications of Contractor

a. The contractor shall have successfully installed similar system fire detection, signaling control components on a previous project of comparable size and complexity. The owner reserves the right to reject any control components for which evidence of a successful prior installation performed by the contractor cannot be provided.
b. The contractor shall have in-house engineering and project management capability consistent with the requirements of this project. Qualified and approved representatives of the system manufacturer shall perform the detailed engineering design of central and remote control equipment. Qualified and approved representatives of the system manufacturer shall produce all panel and equipment drawings and submittals, operating manuals. The contractor is responsible for retaining qualified and approved representative(s) of those system manufacturers specified for detailed system design and documentation, coordination of system installation requirements, and final system testing and commissioning in accordance with these specifications.
c. Quality Assurance/Control Installer's Certification
    1) The engineered systems distributor must be licensed in the state of project location and have been incorporated in the business in that state for a minimum of 5 years.
    2) Provide in the submittal a copy of the contractors training certification issued by the manufacturer of the Life Safety System.
d. Provide a copy of the installing technician's NICET certification level III or IV.
e. System Calculations - complete calculations shall be provided which show the electrical load on the following system components:
    1) Each system power supply, including stand alone booster supplies.
    2) Each standby power supply (batteries).
    3) Each notification appliance circuit.
    4) Each auxiliary control circuit that draws power from any system power supply.

3. Closeout Submittal
a. Four (4) copies of the following documents shall be delivered to the building owner's representative at the time of system acceptance. The close out submittals shall include:
    1) Project specific operating manuals covering the installed Life Safety System. A generic or typical owner's instruction and operation manual shall not be acceptable to fulfill this requirement.
    2) As-Built drawings consisting of: a scaled plan of each building showing the placement of each individual item of the Life Safety System equipment as well as raceway size and routing, junction boxes, and conductor size, quantity, and color in each raceway. All drawings must reflect point to point wiring, device address and programmed characteristics as verified in the presence of the engineer and/or the end user unless device addressing is electronically generated, and automatically graphically documented by the system.

3) Provide all drawings in standard .DXF format.
4) Provide the name, address and telephone of the authorized factory representative.
5) A filled out Record of Completion similar to NFPA 72, 2013 edition figure 1-6.2.1.

F. Warranty and Maintenance
1. Warranty
a. The contractor shall warranty all materials, installation and workmanship for one (1) year from date of acceptance, unless otherwise specified. A copy of the manufacturer's warranty shall be provided with close-out documentation and included with the operation and installation manuals.
b. The System Supplier shall maintain a service organization with adequate spare parts stock within 100 miles of the installation. Any defects that render the system inoperative shall be repaired within 24 hours of the owner notifying the contractor.
2. Spare Parts
a. The Contractor shall supply the following spare parts:
1) Automatic detection devices - Two (2) percent of the installed quantity of each type.
2) Manual fire alarm stations - Two (2) percent of the installed quantity of each type.
3) Glass rods or panels for break glass manual fire alarm stations (if used) - <Ten> percent of the installed quantity, but no less than two devices.
4) Audible and visible devices - One (1) percent of the installed quantity of each type, but no less than two (2) devices.
5) Keys - A minimum of three (3) sets of keys shall be provided and appropriately identified.

G. Training
1. The System Supplier shall schedule and present a minimum of 4 hours of documented formalized instruction for the building owner, detailing the proper operation of the installed System.
2. The instruction shall be presented in an organized and professional manner by a person factory trained in the operation and maintenance of the equipment and who is also thoroughly familiar with the installation.
3. The instruction shall cover the schedule of maintenance required by NFPA 72 and any additional maintenance recommended by the system manufacturer.
4. Instruction shall be made available to the Local Municipal Fire Department if requested by the Local Authority Having Jurisdiction.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Acceptable fire alarm system manufacturers include:

1. Edwards Systems Technology, Inc.

2. Notifier AM 2020
3. Pyrotronics MXLV

2.02 PANEL COMPONENTS & FUNCTIONS

A. General
1. The control panel shall be a multi-processor-based system designed specifically for fire and releasing system applications. The control panel shall be listed and approved for the application standard(s) as listed under the General section.
2. The control panel shall include all required hardware, software and system programming to provide a complete and operational system. The control panel shall assure that life safety takes precedence among all panel activities.
3. The control panel shall include the following capacities:
   a. Support up to 380 analog/addressable points per panel (1,900 total, with 5 networked panels).
   b. Support up to 5 fully supervised network remote annunciators.
   c. Support a DACT (dialer) for off premise notification.
   d. Support up to 576 chronological events in history.
   e. Provide 25% spare capacity on each data line.
4. The control panel shall include the following features:
   a. Provide auto-programming and electronic addressing and mapping of analog/addressable devices.
   b. Provide an operator interface display that shall include functions required for annunciation, command and control system functions.
   c. Provide a discreet system control switch provided for reset, alarm silence, local silence, drill switch, up/down switches, status switch, program switch, enable and disable switches, activate and restore switches, reports switch and test switch.
   d. Provide system reports that provide sensitivity and history details.
   e. Provide an authorized operator with the ability to operate or modify system functions like system time, date, passwords; and auto-program, enable mapping, restart the system and clear control panel event history file.
   f. Provide an authorized operator to perform test functions within the installed system.
5. Supervision of system components, wiring, initiating devices and software shall be provided by the control panel. Failure or fault of system component or wiring shall be indicated by type and location on the LCD display. Software and processor operation shall be independently monitored for failure.

B. Annunciation
1. The system shall be designed and equipped to receive, monitor, and annunciate signals from devices and circuits installed throughout the building. Manufacturer's standard control switches shall be acceptable if they provide the required operation, including performance, supervision and position indication. If the manufacturers' standard switches do not comply with these requirements, fabrication of custom manual controls acceptable to the owner is required.
2. Receipt of alarm, trouble, and supervisory signals shall activate integral audible devices at the control panel(s) and at each remote annunciation device.
3. The annunciator shall contain the following system status indicators:

80 character Backlit Liquid Crystal Display
System Power Indicator – green LED
System Common Alarm – red LED
System Common Trouble – yellow LED
System Common Supervisory – yellow LED
System Common Monitor – yellow LED
System Ground Fault – yellow LED
System CPU Fault – yellow LED
System Disables – yellow LED
System Test Point(s) – yellow LED
System Reset Switch with Integral yellow LED
System Alarm Silence Switch with Integral yellow LED
System Local Silence Switch with Integral yellow LED
System Drill Switch with Integral yellow LED
System Message Queue Scroll Switches
Additional button as required to provide system control and operator functions.

4. The network annunciator(s) shall be an EST 2 series.

C. Power Supply
1. Each system power supply shall be a minimum of 6 amps @ 24 vdc.
2. Upon failure of normal (AC) power, the affected portion(s) of the system shall automatically switch over to secondary power without losing any alarm, trouble or operator acknowledgment signals.
3. Each system power supply shall be individually annunciated and shall identify the inoperable power supply in the event of a trouble condition.
4. All standby batteries shall be continuously monitored by the system. Low battery and disconnection of battery power supply conditions shall immediately annunciate as a trouble signal, identifying the deficient batteries.
5. All system power supplies shall be capable of recharging their associated batteries, from a fully discharged condition to a capacity sufficient to allow the system to perform consistent with the requirements of this section, in 48 hours maximum.
6. All AC power connections shall be to the building's designated emergency electrical power circuit and shall meet the requirements of Section 1-5.2 of NFPA 72 - 2013. The AC power circuit shall be installed in conduit raceway. The power circuit disconnect means shall be clearly labeled FIRE ALARM CIRCUIT CONTROL and shall have a red marking. The location of the circuit disconnect shall be labeled permanently inside the each control panel.
7. The power supply shall be an EST model 2-PPS/6A.

D. Display
1. The system shall allow message routing to be configured to any or all annunciators.
2. All system printer port shall be configurable to output any combination of alarm, supervisory, trouble, or monitor, event messages.
3. Each LCD display on each annunciator shall be configurable to display the status of any combination of alarm, supervisory, trouble, or monitor, event messages.
4. Clear distinction shall be provided between alarm, supervisory, trouble, and monitor status messages.
5. The system shall provide the ability to retrieve data from the analog/addressable

detectors to a PC while the system is on-line and operational in the protected premises. The uploaded data may then be analyzed in a diagnostic program supplied by the system manufacturer.

6. A standby power supply shall automatically supply electrical energy to the system upon primary power supply failure.

E. Dialer – DACT

1. The system shall provide an off premise Digital Alarm Communications Transmitter (DACT) capable of transmitting system alarm, trouble and supervisory events to a central monitoring station (CMS). The DACT shall support dual telephone lines, 20 PPS 4/2 communications, and configured for dual tone multi-frequency (DTMF) or pulse modes. It shall be possible to delay AC power failure reports, auto test call, and site program the DACT using a touch tone phone and password.
2. The DACT shall be an EST model DL2.

F. Reports

1. The system shall provide the operator with system reports that give detailed chronological description of the last 576 system events. The system shall provide a report that gives a listing of the sensitivity and environmental compensation usage of all of the detectors on the system, or specified analog/addressable circuit.
2. The system report shall also include facility name, compiled date, compiler revision, project revision and report date. The system shall output these reports via the main LCD, and reports shall be capable of being printed on the system printer.

2.03 FIELD-MOUNTED SYSTEM COMPONENTS

A. Initiating Devices

1. Smoke Detectors & Accessories
   a. Analog Addressable Smoke General
      1) Each analog addressable smoke detector's sensitivity shall be capable of being programmed individually as: most sensitive, more sensitive, normal, less sensitive or least sensitive.
      2) The system shall allow for changing of detector types for service replacement purposes without the need to reprogram the system. The replacement detector type shall automatically continue to operate with the same programmed sensitivity levels and functions as the detector it replaced. System shall display an off-normal condition until the proper detector type has been installed or change in the application program profile has been made.
   b. Smoke Detector Photoelectric or Photo/Heat
      1) Provide analog/addressable photoelectric smoke detectors as required. The system shall have the ability to set the sensitivity and alarm verification of each of the individual detectors on the circuit. It shall be possible to automatically change the sensitivity of individual analog/addressable detectors for the day and night periods. Each smoke detector shall be capable of transmitting alarm signals as well as normal, trouble and need

cleaning information. It shall be possible to program control panel activity to each level. Each smoke detector may be individually programmed to operate at any one of five (5) sensitivity settings. Each detector microprocessor shall contain an environmental compensation algorithm that identifies and sets ambient environmental thresholds approximately six times an hour. The microprocessor shall monitor the environmental compensation value and alert the system operator when the detector approaches 80% and 100% of the allowable environmental compensation value.

2) The analog/addressable photoelectric smoke detector shall be an EST model SIGA-PS.

3) Where required by designed drawings provide a combination photo/heat detector in one device. The unit shall be EST model SIGA-PHS.

c. Duct Detector Housing

1) Provide smoke detector duct housing assemblies to mount an analog/addressable detector along with a standard, relay or isolator detector mounting base. The housing shall also protect the measuring chamber from damage and insects. The housing shall utilize an air exhaust tube and an air sampling inlet tube that extends into the duct air stream up to ten feet. Drilling templates and gaskets to facilitate locating and mounting the housing shall also be provided. The housing shall be finished in baked red enamel. Remote alarm LED indicators and remote test stations shall be provided.

2) The smoke detector duct housing shall be an EST model SIGA-DH.

d. Relay Module

1) Provide addressable control relay circuit modules at the locations shown on the drawings. The module shall provide one (1) form C dry relay contacts rated at 24Vdc @ 2 amps (pilot duty) to control external appliances or equipment. The position of the relay contact shall be confirmed by the system firmware.

2) The addressable control relay circuit module shall be an EST model SIGA-CR.

2. Fixed Temperature – ROR Heat Detector

a. Provide analog/addressable combination fixed temperature / rate-of-rise detectors at the locations shown on the drawings. The heat detector shall have a nominal fixed temperature alarm point rating of 135°F (57°C) and a rate of rise alarm point of 15°F (9°C) per minute. The heat detector shall be rated for ceiling installation at a minimum of 70 ft (21.3m) centers and be suitable for wall mount applications.

b. The analog/addressable combination fixed temperature / rate-of-rise detector shall be EST model SIGA-HRS.

3. Detector Bases – Standard

a. Provide standard detector mounting bases suitable for mounting on North American 1-gang, 3½ or 4 inch octagon box and 4 inch square box, or European BESA or 1-gang box. The base shall, contain no electronics and support all series detector types.

b. The standard detector base shall be an EST model SIGA-SB4.

4. Manual Station - Double Action Single Stage
   a. Provide analog/addressable double action, single stage fire alarm stations at the locations shown on the drawings. The fire alarm station shall be of polycarbonate construction and incorporate an internal toggle switch. A locked test feature shall be provided. The station shall be finished in red with silver "PULL IN CASE OF FIRE" lettering. The manual station shall be suitable for mounting on North American 2 ½ (64mm) deep 1-gang boxes and 1 ½ (38mm) deep 4 square boxes with 1-gang covers.
   b. The analog/addressable double action, single stage fire alarm station shall be EST model SIGA-278.
5. Door Holders
   a. Provide electromagnetic Floor or Wall mounted door holders as shown on the contract drawings. The door holders housing shall be finished aluminum color, durable, baked polyester powder paint. The floor or wall section houses the electromagnet while the contact plate attaches to the door. The contact plate has a shock absorbing nylon swivel ball which allows the plate to adjust to any door angle. The door holder shall have a holding force of approximately 25Lbf. (111N). The door holders shall be suitable for mounting on North American 2 x 4 inch outlet boxes. The model number is EST 1504-AQ.
6. Beam Detectors
   a. Provide beam detectors with automatic gain control and designed to detect smoke in a large volume. The system will be comprised of three pieces, a transmitter head, a receiver head, and a control box. When the signal strength is reduced to a level between the obscuration threshold and 93% for more than 8 to 10 seconds, the fire alarm output relay is activated. The alarm obscuration threshold may be set at 25%, 35% or 50% obscuration, depending on the application. Reduction in signal strength below 93% is indicated as a fault condition. The model number is EST Fireray 2000.
7. 120VAC Smoke Detectors
   a. Provide Gentex 3120F 120 Volt smoke detectors as required in compliance with UL 217, applicable IBC/IFC Standards and NFPA 72. Provide with a 9 VDC alkaline battery for backup in the event building power is lost. The battery impedance shall be verified and the detector shall provide a low or missing battery warning. Provide three position test feature that simulates a 0.85% and 3.5% actual smoke condition in full compliance with NFPA 72 and UL Standards.
   b. For all rooms indicated by the Architect to be handicap accessible provide a Gentex 7109 CS-W wall mounted 120VAC smoke detector with 9 VDC battery backup with local 90dba piezo and 177 candela strobe with "FIRE" lettering and listed per UL 1971.

B. Control Modules
1. Control Relay Module - SIGA-CR
   a. Provide intelligent control relay modules as required. The Control Relay Module shall provide one form "C" dry relay contact rated at 2 amps @ 24 VDC to control external appliances or equipment shutdown. The control relay shall be rated for pilot duty and releasing systems. The

position of the relay contact shall be confirmed by the system firmware. The control relay module shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers.

b. The addressable control relay circuit module shall be an EST model SIGA-CR.

2. Dual Input Module - SIGA-CT2
   a. Provide intelligent dual input modules as required. The Dual Input Module shall provide two (2) supervised Class B input circuits each capable of a minimum of 4 personalities, each with a distinct operation. The module shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers. The dual input module shall support the following circuit types:
      1) Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.)
      2) Normally-Open Alarm Delayed Latching (Waterflow Switches)
      3) Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.)
      4) Normally-Open Active Latching (Supervisory, Tamper Switches
   b. The intelligent dual input module shall be an EST model SIGA-CT2.
3. Dual Input Signal Module - SIGA-CC2
   a. Provide intelligent dual input signal modules as required. The Dual Input (Dual Riser Select) Signal Module shall provide a means to selectively connect one of two (2) signaling circuit power risers to one (1) supervised output circuit. The module shall be suitable for mounting on North American 2 ½" (64mm) deep 2-gang boxes and 1 ½" (38mm) deep 4" square boxes with 2-gang covers, or European 100mm square boxes. The dual input signal module shall support the following operation:
      Audible/Visible Signal Power Selector (Polarized 24 Vdc @ 2A, 25 Vrms @ 50w or 70 Vrms @ 35w of Audio).
   b. The intelligent dual input signal module shall be an EST model SIGA-CC2.
4. Isolator Module - SIGA-IM
   a. Provide intelligent fault isolators modules as required. The Isolator Module shall be capable of isolating and removing a fault from a class A data circuit while allowing the remaining data loop to continue operating. The module shall be suitable for mounting on North American 2 ½" (64mm) deep 2-gang boxes and 1 ½" (38mm) deep 4" square boxes with 2-gang covers, or European 100mm square boxes.
   b. The intelligent fault isoloator module shall be an EST model SIGA-IM.
5. Monitor Module - SIGA-MM1
   a. Provide intelligent monitor modules as required. The Monitor Module shall be factory set to support one (1) supervised Class B Normally-Open Active Non-Latching Monitor circuit. The monitor module shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers.
   b. The intelligent monitor module shall be an EST model SIGA-MM1.
6. Single Input Module - SIGA-CT1

a. Provide intelligent single input modules as required. The Single Input Module shall provide one (1) supervised Class B input circuit capable of a minimum of 4 personalities, each with a distinct operation. The module shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers. The single input module shall support the following circuit types:
   1) Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.)
   2) Normally-Open Alarm Delayed Latching (Waterflow Switches)
   3) Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.)
   4) Normally-Open Active Latching (Supervisory, Tamper Switches)

b. The intelligent single input module shall be an EST model SIGA-CT1.

7. Single Input Signal Module - SIGA-CC1
   a. Provide intelligent single input signal modules as required. The Single Input (Single Riser Select) Signal Module shall provide one (1) supervised Class B output circuit capable of a minimum of 2 personalities, each with a distinct operation. When selected as a telephone power selector, the module shall be capable of generating its own "ring tone". The module shall be suitable for mounting on North American 2 ½" (64mm) deep 2-gang boxes and 1 ½" (38mm) deep 4" square boxes with 2-gang covers, or European 100mm square boxes. The single input signal module shall support the following operations:
      1) Audible/Visible Signal Power Selector (Polarized 24 Vdc @ 2A, 25Vrms @50w or 70 Vrms @ 35 Watts of Audio)
      2) Telephone Power Selector with Ring Tone (Fire Fighter's Telephone)
   b. The intelligent single input signal module shall be an EST model SIGA-CC1.
8. Universal Class AB Module - SIGA-UM
   a. Provide intelligent class A/B modules as required.The Universal Class A/B Module shall be capable of a minimum of fifteen (15) distinct operations. The module shall be suitable for mounting on North American 2 ½" (64mm) deep 2-gang boxes and 1 ½" (38mm) deep 4" square boxes with 2-gang covers, or European 100mm square boxes. The universal class A/B module shall support the following circuit types:
      1) Two (2) supervised Class B Normally-Open Alarm Latching.
      2) Two (2) supervised Class B Normally-Open Alarm Delayed Latching.
      3) Two (2) supervised Class B Normally-Open Active Non-Latching.
      4) Two (2) supervised Class B Normally-Open Active Latching.
      5) One (1) form "C" dry relay contact rated at 2 amps @ 24 Vdc.
      6) One (1) supervised Class A Normally-Open Alarm Latching.
      7) One (1) supervised Class A Normally-Open Alarm Delayed Latching.
      8) One (1) supervised Class A Normally-Open Active Non-Latching.

9) One (1) supervised Class A Normally-Open Active Latching.
10) One (1) supervised Class A 2-wire Smoke Alarm Non-Verified.
11) One (1) supervised Class B 2-wire Smoke Alarm Non-Verified.
12) One (1) supervised Class A 2-wire Smoke Alarm Verified
13) One (1) supervised Class B 2-wire Smoke Alarm Verified
14) One (1) supervised Class A Signal Circuit, 24Vdc @ 2A.
15) One (1) supervised Class B Signal Circuit, 24Vdc @ 2A.

b. The intelligent class A/B module shall be an EST model SIGA-UM.

9. Waterflow-Tamper Module - SIGA-WTM
   a. Provide intelligent waterflow/tamper modules as required. The Waterflow/Tamper Module shall be factory set to support two (2) supervised Class B input circuits. Channel A shall support a Normally-Open Alarm Delayed Latching Waterflow Switch circuit. Channel B shall support a Normally-Open Active Latching Tamper Switch. The waterflow/tamper module shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers.
   b. The intelligent waterflow/tamper module shall be an EST model SIGA-WTM.

C. Notification Appliances
1. General (signals)
   a. All appliances, which are supplied, for the requirements of this specification shall be UL Listed for Fire Protective Service, and shall be capable of providing the "equivalent facilitation" which is allowed under the Americans with Disabilities Act Accessibilities Guidelines (ADA(AG)), and shall be UL 1971 Listed.
   b. All appliances shall be of the same manufacturer as the fire alarm control panel specified to insure absolute compatibility between the appliances and the control panels, and to insure that the application of the appliances are done in accordance with the single manufacturer's instructions.
   c. Any appliances that do not meet the above requirements, and are submitted for use must show written proof of their compatibility for the purpose intended. Such proof shall be in the form of documentation from all manufacturers that clearly states that their equipment (as submitted) is 100% compatible with each other for the purpose intended. All strobes shall be provided with lens markings oriented for wall mounting.
   d. All notification appliances shall be white unless noted otherwise on the drawings.
2. Low Profile Horns
   a. Provide low profile wall mount horns as required. The horn shall provide an 84-dBA sound output at 10 ft. when measured in reverberation room per UL-464. The horn shall have a selectable steady or synchronized temporal output. In and out screw terminals shall be provided for wiring. The horn shall mount in a North American 1-gang box.
   b. The low profile wall mount horns shall be EST Genesis series.
3. Low Profile Horn-Strobes

a. Provide low profile wall mount horn/strobes as required. The horn/strobe shall provide an audible output of 84 dBA at 10 ft. when measured in reverberation room per UL-464. Strobes shall provide synchronized flash outputs. The strobe output shall be determined as required by its specific location and application from a family of 15cd, 30cd, 60cd, 75cd & 110cd devices. The horn shall have a selectable steady or synchronized temporal output. In and out screw terminals shall be provided for wiring. Low profile horn/strobes shall mount in a North American 1-gang box.
b. The low profile wall mount horn/strobes shall be EST Genesis series.

4. Low Profile Strobes
a. Provide low profile wall mounted strobes as required. In and out screw terminals shall be provided for wiring. Strobes shall provide synchronized flash outputs. Strobe output shall be determined as required by its specific location and application from a family of 15cd, 30cd, 60cd, 75cd, or 110cd devices. Low profile strobes shall mount in a North American 1-gang box.
b. The low profile wall mounted strobes shall be EST Genesis Series.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General
1. Install system components and all associated devices in accordance with applicable NFPA Standards and manufacturer's recommendations.
2. Installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection, and testing of fire alarm systems. Examples of qualified personnel shall include, but not be limited to, the following:
a. Factory trained and certified personnel.
b. National Institute of Certification in Engineering Technologies (NICET) fire alarm level II certified personnel.
3. Contractor shall be certified by state or local authority.
4. All equipment shall be attached to walls and ceiling/floor assemblies and shall be mounted firmly in place.
5. Detectors shall not be supported solely by suspended ceilings. Fasteners and supports shall be sized to support the required load.

B. Installation Sequence
1. Installation of the systems shall be conducted in stages and phased such that circuits and equipment are installed in the following order:
a. Riser conduits, AC power conduits and control cabinets.
b. Fire command center, remote control panel(s), control component(s), annunciator(s), remote CRT terminal(s), and printer(s).
c. Conduits and wiring for complete notification circuits and appliance installation throughout facility.
d. Pre-test the audible and visual notification appliance circuits.
e. Install all new detection devices.

f. Terminations between field devices and the associated control equipment.
g. The detection system shall be switched over and end of each day the system shall be operational. At no time will the system be placed out of service over night.
h. Complete the interface to the building automation system.
i. Complete contractor pre-test of system.
j. Complete system testing.

C. Conductors–Open Cable-Raceway
1. The requirement of this section apply to all system conductors, including all signaling line, initiating device, notification appliance, auxiliary function, remote signaling, AC and DC power and grounding/shield drain circuits, and any other wiring installed by the Contractor pursuant to the requirements of these Specifications.
2. All circuits shall be rated power limited in accordance with NEC Article 760.
3. All circuits shall be installed in raceway or plenum rated cable at the discretion of the Engineer.
4. All new system conductors shall be of the type(s) specified herein.
5. All initiating circuit, signaling line circuit, AC power conductors, shield drain conductors and grounding conductors, shall be solid copper, stranded or bunch tinned (bonded) stranded copper.
6. All signaling line circuits, including all addressable initiating device circuits shall be 18 AWG minimum multi-conductor jacketed twisted cable or twisted shielded or as per manufacturer's requirements.
7. All non-addressable initiating device circuits, 24 VDC auxiliary function circuits shall be 18 AWG minimum or per manufacturer's requirements.
8. All notification appliance circuit conductors shall be solid copper or bunch tinned (bonded) stranded copper. Where stranded conductors are utilized, a maximum of 7 strands shall be permitted for No. 16 and No. 18 conductors, and a maximum of 19 strands shall be permitted for No. 14 and larger conductors.
9. All audible notification appliance circuits shall be 14 AWG minimum twisted pairs or twisted pairs shielded or per manufacturer's requirements.
10. All visual notification appliance circuits shall be 14 AWG minimum THHN or twisted pairs or twisted shielded pairs or per manufacturer's requirements.
11. Conductors and Raceway
    a. The contractor shall neatly tie-wrap all field-wiring conductors in the gutter spaces of the control panels and secure the wiring away from all circuit boards and control equipment components. All field-wiring circuits shall be neatly and legibly labeled in the control panel. No wiring except home runs from life safety system circuits and system power supply circuits shall be permitted in the control panel enclosures. No wiring splices shall be permitted in a control panel enclosure.
    b. All penetration of floor slabs and firewalls shall be fire stopped in accordance with all local fire codes.
12. Open Cable
    a. Power-limited cable in accordance with NEC 70, where used, not installed in UL listed metal conduit or raceway shall be mechanically protected by building construction features.
    b. Installation shall be in areas not subjected to mechanical injury.

c. All circuits shall be supported by the building structure. Cable shall be attached by straps to the building structure at intervals not greater than 10 feet. Wiring installed above drop ceilings, cable shall not be laid on ceiling tiles. Cable shall not be fastened in a manner that puts tension on the cable.
d. Cable type shall be FPLP, FPLR or FPL, or permitted substitutions, selected for the installation application as required by NEC 70, Section 760-61.
e. All cable that is not enclosed by conduit shall be supported and anchored with nylon straps or clamps. The use of staples is prohibited.

13. Conduit Raceway
a. All systems and system components listed to UL864 Control Units for Fire Protective Signaling Systems may be installed within a common conduit raceway system, in accordance with the manufacturer's recommendations. System(s) or system components not listed to the UL864 standard shall utilize a separate conduit raceway system for each of the sub-systems.
b. The requirements of this section apply to all system conduits, raceways, electrical enclosures, junction boxes, pull boxes and device back boxes.
c. All system conduits shall be of the sizes and types specified.
d. All system conduits shall be EMT, 3/4 -inch minimum, except for flexible metallic conduit used for whips to devices only, maximum length 6 feet, 3/4-inch diameter, minimum.
e. All system conduits, which are installed in areas, which may be subject to physical damage or weather, shall be IMC or rigid steel, 3/4 -inch minimum.
f. Conduits shall be sized according to the conductors contained therein. Cross sectional area percentage fill for system conduits shall not exceed 40%.
g. Provide all new conduit raceway and conduit riser.
h. All fire alarm conduit systems shall be routed and installed to minimize the potential for physical, mechanical or by fire damage, and so as not to interfere with existing building systems, facilities or equipment, and to facilitate service and minimize maintenance.
i. All conduits, except flexible conduit whips to devices, shall be solidly attached to building structural members, ceiling slabs or permanent walls. Conduits shall not be attached to existing conduit, duct work, cable trays, other ceiling equipment, drop ceiling hangers/grids or partition walls, except where necessary to connect to initiating, notification, or auxiliary function devices.
j. All system conduits, junction boxes, pull boxes, terminal cabinets, electrical enclosures and device back boxes shall be readily accessible for inspection, testing, service and maintenance.

3.02 FIELD QUALITY CONTROL

A. Test & Inspection
1. All intelligent analog addressable devices shall be tested for current address, sensitivity, and user defined message.

2. All wiring shall be tested for continuity, shorts, and grounds before the system is activated.
3. All test equipment, instruments, tools and labor required to conduct the tests shall be made available by the installing contractor.
4. The system including all its sequence of operations shall be demonstrated to the Owner, his representative, and the local fire inspector. In the event the system does not operate properly, the test shall be terminated. Corrections shall be made and the testing procedure shall be repeated until it is acceptable to the Owner, his representatives and the fire inspector.
5. At the final test and inspection, a factory trained representative of the system manufacturer shall demonstrate that the system functions properly in accordance with these specifications. The representative shall provide technical supervision, and participate during all of the testing for the system.
6. All fire alarm testing shall be in accordance with National Fire Alarm Code, NFPA 72 - 2013, Chapter 7.
7. A letter from the Contractor certifying that the system is installed entirely in accordance with the system manufacturer's recommendations and within the limitations of the required listings and approvals, that all system hardware and software has been visually inspected and functionally tested by a manufacturer's certified representative, and that the system is in proper working order.

END OF SECTION

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