

ADVERTISEMENT FOR REQUEST FOR PROPOSAL
COBB COUNTY PURCHASING DEPARTMENT

BID OPENING DATE: JULY 29, 2010

Sealed proposals from qualified contractors will be receive before 12:00 NOON, July 29, 2010, in the Cobb County Purchasing Department, 1772 County Services Parkway, Marietta, GA 30008 for furnishing all labor. Materials, equipment, appliances, etc. pursuant to the plans, specifications, condition and addenda for:

**SEALED BID # 10 -10-5507
REQUEST FOR PROPOSAL
DESIGN/BUILD
ENERGY HVAC RETROFITS FOR THREE (3) COBB COUNTY BUILDINGS
COBB COUNTY PROPERTY MANAGEMENT DEPARTMENT**

**PRE-PROPOSAL MEETING: JULY 13, 2010 @ 10:00 A.M.
COBB COUNTY PURCHASING DEPARTMENT
1772 COUNTY SERVICES PARKWAY
MARIETTA, GEORGIA 30008**

No bids will be accepted after the 12:00 noon deadline.

Proposals are opened at 2:00 p.m. at Cobb County Purchasing Department, 1772 County Services Parkway, 2nd Floor, Bid/Meeting Room, Marietta, GA 30008.

All contractors wishing to submit proposals for this work must submit a qualification statement form (in the proposal package) to be considered. Proposals must be accompanied by bid security in the amount not less than five percent (5%) of the base bid. Performance Bond and Labor and Material Payment Bond, or other security instruments as allowed by law each in the amount equal to 100% of the contract sum will be required of the successful bidder. Bonds must be written by a surety company licensed to do business in the State of Georgia, have a "Best's" rating of "A" or better, appear on the current U.S. Treasury Department list of sureties that are acceptable on bonds for the federal government (circular 570), and have recommended bonds limits equal to or in excess of those required for this project; otherwise acceptable to the owner.

No proposal may be withdrawn for a period of ninety (90) days after date of bid opening, unless otherwise specified in the bid documents. Cobb County will consider the competency and responsibility of bidders in making the award. Cobb County reserves the right to reject any and all proposals, to waive informalities and technicalities, to reject portions of the proposals, and to award contracts in a manner consistent with the County and the laws governing the State of Georgia.

This solicitation and any addenda are available for download in PDF format on the Cobb County purchasing website. www.purchasing.cobbcountyga.gov

To request a copy of the proposal documents, **FAX** the following information to the Purchasing Department @ 770-528-1154 or **e-mail** requests to purchasing@cobbcounty.org:

Company name, contact name, company address, phone number and fax number.

Please reference the proposal number and the title of the proposal in the request

Advertise : JULY 2, 9, 16, 23, 2010

BIDDING INSTRUCTIONS – TERMS AND CONDITIONS

1. PREPARATION OF BID:

- (A) Bidders are expected to examine the drawings, specifications, schedules, and all instructions. Failure to do so will be at the bidder's risk.
- (B) Each bidder shall furnish the information required by the bid form. The bidder shall sign and print or type his/her name where designated. The person signing the bid must initial erasures or other changes.
- (C) Unit price for each quotation shall be shown and such price shall include packing unless otherwise specified, along with a total and grand total where applicable. In case of discrepancy between a unit price and extended price, the unit price will be presumed correct.
- (D) Where not otherwise specified, bidders must definitely state DATE OF DELIVERY.

2. EXPLANATION TO BIDDERS:

Any explanation desired by a bidder regarding the meaning or interpretation of Invitation to Bids, Request for Proposals or Qualifications, drawings, specifications, etc., must be in writing. All questions must be received within seven (7) business days prior to the bid opening date for a response to be generated by the County to all bidders in the form of an addendum. If any statement in the bidding documents, specifications, etc., appears ambiguous to the bidder, the bidder is specifically instructed to make a written request to the Purchasing Department, unless otherwise outlined in the specifications. Any information given to a prospective bidder concerning an Invitation for Bid will be furnished to all prospective bidders, as an addendum to the invitation, if such information is necessary to bidders in submitting bids on the invitation or if the lack of such information would be prejudicial to uninformed bidders. Receipt of the addendum by a bidder must be acknowledged on the bid or by letter received before the date and time specified for the bid opening. **ORAL EXPLANATION OR INSTRUCTIONS GIVEN BEFORE THE AWARD OF THE CONTRACT WILL NOT BE BINDING.**

3. SUBMISSION OF BIDS: FACSIMILE BIDS WILL NOT BE CONSIDERED.

- (A) Any Bid Package and modifications thereof shall be enclosed in a sealed envelope, addressed to the office specified in the Invitation to Bid, with the name and address of the bidder, the date and hour of bid opening, and name of bid. A bid reply label will be included in most bid packages stating the above referenced information. Any bid package NOT having bid information on outside of package could be opened as regular mail, and bid could be disqualified.
- (B) Samples of items, when required, must be submitted within the time specified, unless otherwise specified by the County, and at no expense to the County
- (C) An item offered must at least meet specifications called for and must be of quality which will adequately service the purpose and use for which it was intended.
- (D) Full identification of each item bid upon, including brand name, make, model, and catalog number, must be furnished according to the bid specifications if requested to identify exactly what the bidder is proposing. Supporting literature may be furnished to further substantiate the proposal.
- (E) The bidder represents that the article(s) to be furnished under this Invitation to Bid is (are) new and that the quality has not deteriorated so as to impair its usefulness.
- (F) Bids cannot be withdrawn or corrected after the bid opening (except reductions or changes by the successful bidder which would be beneficial or advantageous to the County). The County as deemed necessary may reject changes.
- (G) Cobb County is exempt from Federal Excise Tax and Georgia Sales Tax.
- (H) Cobb County does not accept conditional bids.

4. DEFAULT:

The Award as a result of bids received under this invitation may be in part based on the delivery factor. Accordingly, should delivery fail to be performed within the time specified by the bidder, the bid may then be declared in default of the contract. In such event, the County may then proceed to purchase in the open market the items from another source.

5. F.O.B. POINT:

Unless otherwise stated in the Invitation to Bid and any resulting contract, all articles will be F.O.B. Destination. This means delivered, unloaded, and placed in the designated place.

6. AWARD OF CONTRACT:

The Contract will be awarded to the responsible bidder whose bid will be the most advantageous to the County, price, and other factors considered. The County will make the determination. The County reserves the right at any time to reject any and all bids, to waive informalities and technicalities, to award portions of the bid, and to award contracts consistent with the County and the laws governing the State of Georgia. Normal payment terms are net thirty (30) days after receipt of invoice by the Finance Department.



SUBMIT BID/PROPOSAL TO:
COBB COUNTY PURCHASING DEPARTMENT
1772 COUNTY SERVICES PARKWAY
MARIETTA, GA 30008-4012

BID/PROJECT NUMBER: 10-5507

Request for Proposal
Design/Build

Energy HVAC Retrofits for Three (3) Cobb County Buildings
Cobb County Animal Control, Cobb County Purchasing Department, Cobb County "The Arts Place"

DELIVERY DEADLINE: JULY 29, 2010 BEFORE 12:00 (NOON) EST
(NO BIDS/PROPOSALS WILL BE ACCEPTED AFTER THIS DEADLINE).

OPENING DATE: JULY 29, 2010 @ 2:00 P.M. IN THE PURCHASING DEPARTMENT BID ROOM.

BUSINESS NAME AND ADDRESS INFORMATION:

COMPANY NAME: _____

CONTACT NAME: _____

COMPANY ADDRESS: _____

E-MAIL ADDRESS: _____

PHONE NUMBER: _____

FAX NUMBER: _____

NAME AND OFFICIAL TITLE OF OFFICER GUARANTEEING THIS QUOTATION:

(PLEASE PRINT/TYPE) NAME _____ TITLE _____

SIGNATURE OF OFFICER ABOVE: _____
(SIGNATURE)

TELEPHONE: _____ FAX: _____

BIDDER WILL INDICATE TIME PAYMENT DISCOUNT: _____

BIDDER SHALL INDICATE MAXIMUM DELIVERY DATE: _____

BIDS RECEIVED AFTER THE DATE AND TIME INDICATED WILL NOT BE CONSIDERED. COBB COUNTY RESERVES THE RIGHT TO REJECT ANY AND ALL BIDS, TO WAIVE INFORMALITIES, TO REJECT PORTIONS OF THE BID, TO WAIVE TECHNICALITIES AND TO AWARD CONTRACTS IN A MANNER CONSISTENT WITH THE COUNTY AND THE LAWS GOVERNING THE STATE OF GEORGIA.

THE ENCLOSED (OR ATTACHED) BID IS IN RESPONSE TO INVITATION NUMBER 10-5507; IS A FIRM OFFER, AS DEFINED BY SECTION O.C.G.A. (S) 11-2-205 OF THE CODE OF GEORGIA (GEORGIA LAWS 1962 PAGES 156-178), BY THE UNDERSIGNED BIDDER. THIS OFFER SHALL REMAIN OPEN FOR ACCEPTANCE FOR A PERIOD OF 90 CALENDAR DAYS FROM THE BID OPENING DATE, AS SET FORTH IN THIS INVITATION TO BID UNLESS OTHERWISE SPECIFIED IN THE BID DOCUMENTS.

NOTICE TO BIDDERS - - BID QUOTES MUST INCLUDE INSIDE DELIVERY CHARGES

ADVERTISE DATES: July 2, 9, 16, 23, 2010



COBB COUNTY
PURCHASING DEPARTMENT
1772 County Services Parkway
Marietta, Georgia 30008-4012
(770) 528-8400/FAX (770) 528-1154
www.cobbcounty.org

IMPORTANT NOTICE – PLEASE READ CAREFULLY!!

All vendors are required to submit the ORIGINAL AND AT LEAST one (1) duplicated copy of any bid submitted to Cobb County. Please refer to your bid specifications to determine if more than one (1) copy is required. Non-submission of a duplicate copy may disqualify your bid/proposal.

A “**SEALED BID LABEL**” has been enclosed to affix to your bid. This label ***MUST*** be affixed to the outside of the envelope or package, **even if it is a “NO BID” response**. Failure to attach the label may result in your bid being opened in error or not being routed to the proper location for consideration. No bid will be accepted after the date and time specified. **IT IS THE VENDOR’S RESPONSIBILITY TO ENSURE THAT EACH BID HAS BEEN RECEIVED IN A TIMELY MANNER.**

BIDS MUST BE RECEIVED BEFORE 12:00 (NOON) ON BID OPENING DAY

Bids must be received at the Cobb County Purchasing Department. **Any bids received later than 12:00 (noon) will not be accepted.** The County accepts no responsibility for delays in the mail. Bids are to be mailed or hand delivered to:

COBB COUNTY PURCHASING DEPARTMENT
1772 COUNTY SERVICES PARKWAY
MARIETTA, GA 30008-4012

Bids will be opened at 2:00 P.M. in the Cobb County Purchasing Department, 1772 County Services Parkway, 2nd Floor, Conference/Bid Room, Marietta, GA 30008.

Thank you in advance for your cooperation.

SEALED BID LABEL

SEALED BID ENCLOSED

DELIVER TO:
COBB COUNTY PURCHASING
1772 County Services Parkway
Marietta, GA 30008-4012

SEALED BID # 10-5507 DATE: July 29, 2010

BIDS MUST BE RECEIVED BEFORE 12:00 NOON

DESCRIPTION: Request for Proposal

Design/Build
Energy HVAC Retrofits for Three (3) Cobb County Buildings
Cobb County Animal Control, Cobb County Purchasing Department,
Cobb County "The Arts Place"

PLEASE ATTACH LABEL TO OUTSIDE OF BID PACKAGE



Cobb County...Expect the Best!

REQUEST FOR PROPOSAL

SEALED BID # 10 – 5507

DESIGN/BUILD

**ENERGY HVAC RETROFITS FOR THREE (3) COBB COUNTY BUILDINGS
COBB COUNTY ANIMAL CONTROL, COBB COUNTY PURCHASING DEPARTMENT,
COBB COUNTY “THE ARTS PLACE”**

BID OPENING DATE: JULY 29, 2010

PRE-PROPOSAL CONFERENCE: JULY 13, 2010 @10:00 A M. (E.S.T.)

COBB COUNTY PURCHASING DEPARTMENT

1772 COUNTY SERVICES PARKWAY

MARIETTA, GEORGIA 30008

BIDS ARE RECEIVED IN THE
COBB COUNTY PURCHASING DEPARTMENT

1772 COUNTY SERVICES PARKWAY

MARIETTA, GEORGIA 30008

BEFORE 12:00 (NOON) BY THE BID OPENING DATE

BIDS WILL BE OPENED IN THE COBB COUNTY PURCHASING DEPARTMENT

BID/MEETING ROOM AT 2:00 P.M.

**VENDORS ARE REQUIRED TO SUBMIT THE ORIGINAL AND 5 COPIES OF BID
(UNLESS OTHERWISE SPECIFIED IN BID SPECIFICATIONS)**

N.I.G.P. COMMODITY CODE: 91450

NAME: _____

ADDRESS: _____

REPRESENTATIVE: _____

PHONE: _____ FAX: _____

E-MAIL _____

NOTE: The Cobb County Purchasing Department will not be responsible for the accuracy or completeness of the content of any Cobb County Invitation to Bid or Request for Proposal or subsequent addenda thereto received from a source other than the Cobb County Purchasing Department.



Cobb County...Expect the Best!

"STATEMENT OF NO BID"

COBB COUNTY PURCHASING DEPARTMENT
1772 COUNTY SERVICES PARKWAY
MARIETTA, GA 30008

TO ALL PROSPECTIVE BIDDERS:

Because of the many requests to be placed on our vendors' list, we are continuously updating the list. While we want to include all bona fide vendors, we do not want to mail bids to those vendors who may no longer be interested in participating in our bidding process.

If you do not choose to respond to the attached Invitation to Bid/Request for Proposal, please fill out the form below indicating whether or not you want to be retained on our current vendor list.

Vendors who do not respond in any way (by either submitting a bid or by returning this form) over a period of one year may be removed from the current vendor list.

Vendors who do not wish to bid often return the entire bid package, sometimes at considerable postage expense. Returning the entire bid package is not necessary. Simply return this form.

Thank you for your cooperation.
Cobb County Purchasing Department

**"STATEMENT OF NO BID"
SEALED BID NUMBER 10-5507
DESIGN/BUILD**

**ENERGY HVAC RETROFITS FOR THREE (3) COBB COUNTY BUILDINGS
COBB COUNTY ANIMAL CONTROL, COBB COUNTY PURCHASING DEPARTMENT,
COBB COUNTY "THE ARTS PLACE"**

If you do not wish to respond to the attached Invitation to Bid/Request for Proposal, please complete this form and mail/fax to: **Cobb County Purchasing Department, Attention: Sealed Bid Department, 1772 County Services Parkway, Marietta, GA. Fax # 770-528-1154**

I do not wish to submit a bid/proposal on this solicitation.

I wish to be retained on the vendor list for this commodity or service: Yes _____ No _____

Please PRINT the following:

Company

Representative

You are invited to list reasons for your decision not to bid: _____

COBB COUNTY REQUEST FOR COMPETITIVE SEALED PROPOSALS

DESIGN / BUILD

**ENERGY EFFICIENCY HVAC RETROFITS THREE (3) COBB COUNTY
BUILDINGS**

**COBB COUNTY ANIMAL CONTROL
COBB COUNTY PURCHASING DEPARTMENT
COBB COUNTY'S "THE ARTS PLACE"**

SEALED BID #10-5507

COBB COUNTY REQUEST FOR COMPETITIVE SEALED PROPOSALS

DESIGN / BUILD

ENERGY EFFICIENCY HVAC RETROFITS – THREE (3) COBB COUNTY BUILDINGS

**COBB COUNTY ANIMAL CONTROL
COBB COUNTY PURCHASING HEADQUARTERS
COBB COUNTY’S “THE ARTS PLACE”**

SEALED BID #10-5507

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I. Introduction and Proposal Submittal Overview

The Cobb County Board of Commissioners (Owner) is soliciting competitive sealed proposals from experienced firms for energy efficiency HVAC systems retrofit projects at the Animal Control Building, 1060 Al Bishop Drive, Marietta, GA 30008, Purchasing Department Headquarters, 1772 County Services Parkway, Marietta, GA. 30008, and The Arts Place, 3330 Sandy Plains Road, Marietta, GA 30062 . This Project includes final design programming, energy savings evaluations and documentation, development of final design documents, construction, acceptance and closeout for the replacement of existing heating and cooling equipment. An award will be made to the responsible and responsive offeror whose proposal is determined to be the most advantageous to Cobb County, taking into consideration the evaluation factors set forth in the Request for Competitive Sealed Proposals (RFP).

A County Selection Committee will determine the firm, whose proposal is believed to be most advantageous to the County to provide the Design/Build Construction services for the project. The County Selection Committee members will each review the responses to the RFP's and provide a score for each based on the Selection Criteria contained in Section IV. The Selection Committee will convene and summarize the points earned by each offeror, then establish a list of offerors found by the selection committee to have submitted proposals reasonably susceptible of being selected for award. During the competitive sealed proposal process, proposals received will be opened in a manner so as to avoid disclosure of contents to competing offerors and during any process of discussion, the County will not disclose the contents of proposals.

The Cobb County Board of Commissioners reserves the right to reject all proposals, to waive technicalities and informalities, to reject portions of the proposals, and to award contracts in a manner consistent with the interest of Cobb County and the laws of the State of Georgia.

Each firm is to prepare its proposal according to the RFP format, i.e., by section and paragraph of this RFP. Cobb County reserves the right to reject any proposal not submitted within the required time frame; reject any incomplete proposal submitted; contact client references; require further information; and/or require interviews/presentations from any responding firm. All costs related to the preparation, submittal, and/or presentation of a proposal are the responsibility of the offeror and will not be assumed in full or in part by Cobb County. All proposals shall be accompanied by a bid bond in the amount not less than five percent (5%) of the cost proposal. No proposal shall be considered if a proper bid bond or other authorized security has not been submitted.

Proposals must be submitted before **12:00 noon (local time), July 29, 2010**. **Proposals must be received in a sealed envelope or container. Place the Project name, BID number, and opening date on the submitting envelope or container.** Any proposal received after this time will be rejected and will not be opened. Proposals, timely received, will be opened at 2:00 PM (local time) on July 29, 2010 at the offices of the Cobb County Purchasing Department, 1772 County Services Parkway, Marietta, Georgia 30008.

Proposers shall submit an original and five (5) copies of their response to this RFP to:

**Cobb County Purchasing Department
1772 County Services Parkway
Marietta, Georgia 30008**

**Written inquiries regarding this RFP must be submitted no later than 5:00 PM, Tuesday,
July 20, 2010, and shall be addressed to:**

**Cobb County Purchasing Department
1772 County Services Parkway
Marietta, Georgia 30008
Fax: 770-528-1154
Email: purchasing@cobbcounty.org**

Written responses to all written inquiries received by the deadline will be answered in the form of an addendum.

A Pre-proposal Conference will be held on Tuesday, July 13, 2010, at 10:00 am at the Cobb County Purchasing Department located at 1772 County Services Parkway Marietta, Georgia 30008. All firms intending to respond to this Request for Proposals are strongly urged to attend.

All proposals shall be accompanied by a bid bond in the amount not less than five percent (5%) of the cost proposal. No proposal shall be considered if a proper bid bond or other authorized security has not been submitted. The successful offeror will be required to furnish a satisfactory performance bond and labor and materials payment bond, on forms provided by Owner, each in the amount of the total amount payable by the terms of the contract and will be increased as the contract amount is increased.

No offeror may withdraw its proposal and must honor its proposal for ninety (90) days after the actual date of the opening thereof.

II. Background

Cobb County has received funding provided by the American Reinvestment and Recovery Act of 2009 (ARRA) under an Energy Efficiency and Conservation Block Grant (EECBG) administered by the U.S. Dept. of Energy for performing energy efficiency retrofits of county facilities. A level 1 energy audit was performed by the County's audit contractor that identified opportunities for retrofit projects, and baseline design documents were created for projects recommended by the audits.

Three projects identified by the audit are the subject of this RFP: replacement of aged HVAC equipment at the county's Animal Control offices, Purchasing Department offices, and The Arts Place (recreation facility). This invitation is for the development of full design and construction documents, an energy savings analysis based on the final design, limited measurement and verification of existing and final equipment performance, permitting, all materials and construction per the final, Owner approved design, and complete construction management to complete the project. Basis for the design is: demolition and appropriate disposal of existing systems in accordance with the Owner's Waste Stream Management Plan, installation and performance verification of new equipment, Owner training, and all required project documentation.

As an ARRA funded project, the project will be subject to compliance with ARRA and EECBG requirements. These requirements are incorporated as Section 01000 of the Specifications, “Special Terms and Conditions of the ARRA and EECBG”. Failure to acknowledge compliance on the Bid Form shall be justification, at the Owner’s discretion, for Bidder’s submittal to be excluded from consideration.

A sample contract is included with this RFP. Owner and Design/Builder will enter into a Guaranteed Maximum Price contract based on the Contractor’s bid price for the baseline specifications as included with this RFP, plus an Owner’s allowance to be determined prior to contracting. During Pre-Construction, the Design/Build Contractor will be responsible for pricing and value engineering as well as addressing maintainability and constructability issues. Any changes to the Baseline Specifications recommended during final design shall be subject to Owner approval and must not cause the total project budget to exceed the GMP in the Design/build contract.

III. Scope of Services

The following is a listing of some of the representative services to be provided by the Design/Build Contractor. Additional services are identified in the baseline specifications for this project. The full scope of services will be defined within the contract executed with Cobb County.

A. Design and Pre-construction Phase

1. Develop a provisional construction **CPM** schedule indicating methods and sequencing of construction.
2. Complete design development.
3. Review and adjustment of design to conform to ARRA and EECBG grant requirements.
4. Develop energy savings calculations and a measurement and verification plan.
5. Prepare and complete all necessary final construction documents to demonstrate to the Owner work scope and meeting any and all permit requirements.
6. Perform a “constructability” review of the construction documents.
7. Provide detailed construction cost estimates to develop into a Guaranteed Maximum Price to achieve Owner’s budget.
8. Provide analysis of purchase and/or construction methods for potential quality, cost, and schedule enhancements.
9. Develop budget to be maintained throughout construction.
10. Procure all required permits, approvals, etc.
11. Develop value-engineering options.

B. Construction Phase

1. Establish and maintain coordinating procedures.
2. Develop and maintain a detailed schedule (CPM) including delivery, approvals, inspection, testing, construction, and occupancy.
3. Conduct and record job meetings.
4. Prepare and submit change order documentation for approval.
5. Maintain a system for review and approval of shop drawings.
6. Maintain records and submit bi-weekly reports and formal monthly reports to the County.
7. Maintain quality control and ensure conformity to plans.

8. Obtain all Third Party Special Inspections as required by permitting authority.
9. Provide cost control through progress payment review and verifications according to the approved schedule and contract amounts.
10. Develop as-built drawings to be submitted to Cobb County for maintenance and operations use.
11. Coordinate post-completion activities, including the assembly of guarantees, manuals, closeout documents, training, and the Owner's final acceptance.
12. Obtain, maintain and deliver to Owner all records necessary to demonstrate compliance with ARRA and EECBG grant requirements.

C. *Warranty Phase*

1. Coordinate and monitor the resolution of remaining "punch-list" items.
2. Coordinate, monitor, and resolve all warranty issues to the satisfaction of the County during the one-year general warranty period and as extended.

All Local, County, State, and Federal Codes and regulations must be followed, with particular emphasis on Building Codes, Life Safety Codes, the Americans with Disabilities Act, and ARRA and EECBG requirements.

Once all contract documents are executed, between the County and the successful offeror, the successful offeror will be required to deliver the services required by this RFP. Cobb County must first approve any change in or substitution of project team members, including any consultant, in writing.

IV. Selection Criteria

The Competitive Sealed Proposals will be evaluated based on the information presented in the proposal package, and on an analysis of other publicly available information. The Owner may conduct such investigations or interviews, as it deems necessary to assist in the evaluation of any proposal submitted and to establish to Cobb County's satisfaction the responsibility, qualifications, and financial ability of any offeror.

The selection may be based solely on the evaluation of the information presented in the proposal package. As part of the selection process if the Owner elects, selected firms may be asked to make a presentation to the selection committee. Firms making presentations should provide their lowest pricing in their proposal. Firms submitting proposals **should not** assume that the Owner will elect to pursue any discussion or interviews of the proposals.

A selection committee designated by Cobb County will evaluate the proposals. The ranking of the proposals will be based on the evaluation criteria weighted as follows:

Technical/Qualifications Criteria **80 Points**

Approach to Work: Clarity and logic of approach; understanding of project issues; identification of unique factors; schedule 20 points

Project Team Makeup: The total Commitment / Availability / Depth of key team members; qualifications / experience of

key staff (Contractor, Engineer, Subcontractors, and Subconsultants)	<u>20 points</u>
Specialized Experience: Experience directly related to project	<u>20 points</u>
Quality and Performance: Response of references; quality and satisfactory performance of prior work	<u>15 points</u>
Financial/Assessment of financial information	<u>5 Points</u>
<u>COST</u>	<u>20 Points</u>
Review the completeness of proposal form, construction cost proposal amount and project schedule	<u>20 points</u>

It is anticipated that a contract for the described work will be entered into with the Offeror that, in the opinion of Cobb County, offers the most favorable combination of qualifications, approach, and pricing.

The evaluation by the Selection Committee will be based on the criteria listed. The relative importance of the criteria is also listed. The RFP should be prepared per the following Sections **as well as:**

(a) a one-page letter of transmittal signed by an owner, officer, or authorized agent of the firm acknowledging and accepting the terms and conditions of this RFP; (b) an executed Conflict of Interest Statement. An executed "Officer's Oath" on the form provided will be required of the successful offeror prior to commencing work. The officer shall file the oath whose duty it is to make the payment. If the contractor is a partnership, all of the partners and any officer, agent, or other person who may have represented or acted for them in bidding for procuring the contract shall also make the oath. If the contractor is a corporation, all officers, agents, or other persons who may have acted for or represented the corporation in bidding for or procuring the contract shall make the oath. If such oath is false, the contract shall be void, and all sums paid by the County on the contract may be recovered by appropriate action.

V. Proposer Responses: Qualifications and Information

Provide the following:

A. **Firm or Firms' Information**

1. Complete and return all pages of Bid Summary and Proposer's Submittal, Specifications Section 00300.
2. Primary local contact person(s) and telephone number(s)
3. Total number of firm's local full-time employees
4. Year firm established
5. Local firm's billings for the last three fiscal years
6. Local firms' billing for the current fiscal year
7. Listing and description of last 3 years of litigation involving the local firm
8. Copy of the most recent 3 completed years of audited financial statements (Income Statement and Balance Sheet) for the local firm
9. Cost proposal amount for the work in the baseline specifications in accordance with the pricing proposal format in Specifications Attachment A, Section 00300.
10. List any OSHA violations within the past 3 years.
11. Identify if your firm is registered, or qualifies as, a minority, disadvantaged or women owned business, or is classed as a small business enterprise. If yes, describe the basis for the classification and any independent registrations.

B. **Experience:**

1. List of full service Design/Build Construction projects completed in the last 5 years (maximum of 10 projects). Include: size, cost, total fee, time to complete design services, scope of design services, time to construct facility, description and cost of contractor change orders, special features (energy conservation, etc.), awards received, and type of project (be sure to specify which projects were similar to facilities of this size and type).
2. From the above list, provide a description of between 3 and 5 examples of your experience as prime contractor For each of these projects:
 - a) Provide an owner reference familiar with your performance on the project. ***It is the Offeror's responsibility to ensure that the listed contact and phone number are current.***
 - b) List the individuals who served as the Project Executive/Director, Engineer or Designer, Project Manager, Superintendent, and Cost Estimator. Please note whether this individual is still employed with your firm.
3. List the five most recent projects on which the firm was required to comply with Davis-Bacon Fair Labor Wage requirements. Include name of the project manager and client reference, including name and contact information.

C. **Statement of local firm's capability to absorb additional workload, availability of personnel, and commitment to provide services on a timely basis.**

- ❖ Provide a proposed schedule for the project with major milestones.
- ❖ Discuss any recommended steps to speed implementation of the project and any associated costs.

D. Staffing Management

1. Provide a proposed Project Organizational Chart, which identifies individual names and areas of responsibility. At a minimum, include the following:

- ❖ Design/Builder Project Manager
- ❖ Design/Builder Superintendent
- ❖ Mechanical Engineer responsible for all engineering issues and specifications
- ❖ Other specialty consultants as applicable
- ❖ Test and Balance sub-contractor
- ❖ Controls subcontractor
- ❖ Other major subcontractors as applicable.

Resumes shall show at least the following:

- ❖ Name, specialty, job title, and project job title. The project job title must correspond with the positions listed.
- ❖ Years of relevant experience with firm, and experience with previous employers. Project experience descriptions must include dates.
- ❖ Academic degree(s), discipline and year degree(s) received.
- ❖ Professional registrations.
- ❖ Name of the firm(s) responsible for the individual and office location where employed.
- ❖ A synopsis of specific experience, skills, training, or other qualities, which demonstrate the individual's ability to fulfill the duties of their position.

Provide a current list of other commitments by the Design/Builder and its architects, engineers, and other key team members and estimated completion dates by project in this section of the Proposal. Indicate the current commitments of individual staff to be assigned to the project and involvement with other projects.

3. Please identify the individual who, *from project start to finish*, will be the leader of your construction team and the principal point of contact between your firm and the Owner and Architect along with other consultants.

E. Services

1. Provide a comprehensive outline of the steps you propose in order to meet the services required in this RFP. This detail should indicate what is to be done, who individually, and by name is responsible to do it, and when it is to be completed.
2. Please answer the following questions and/or provide adequate responses:
 - a) Provide one page overview of services typically performed for similar projects using Design/Build Construction techniques.
 - b) How would you implement these services to ensure the success of this project?
 - c) How does your firm implement cost control and scheduling activities during preconstruction?
 - d) Explain your approach to value engineering, citing relevant, specific examples.
 - e) Describe your approach to performance, communications and coordination to ensure minimum disruption to employee operations during the course of the work.

- f) One of the goals of the ARRA and EECBG grant is encouragement of participation by small and disadvantaged business enterprises. If your firm does not qualify for one of these classifications (per your response to Q. A-11 above), describe how your firm would assist the County in encouraging participation by subcontractors who are minority, disadvantaged or women owned or are classed as small business enterprises? Include examples of other projects where you have been successful in meeting similar goals.

F. Other

At your option, you may provide any additional supporting documentation or information in this section of the Proposal, which would be helpful in evaluating your firm's qualifications and commitment or that will further demonstrate that the Offeror can serve the best interests and particular needs of the Owner on this project..

Alternative proposals for suggested alternate approaches may be submitted; however, the base proposal will be used for the comparison, evaluation, and ranking of offerors. Alternative proposals must be clearly labeled and arranged in a separate section of the submittal package. Any alternative proposals would only be considered if the Owner elects to pursue discussions, negotiations, and revisions of the base proposals.

VI. General Terms and Conditions

A. MODIFICATION OR WITHDRAWAL OF PROPOSALS

A submitted proposal may be retrieved in person by an offeror or its authorized representative if, before the scheduled closing time for receipt of proposals, the identity of the persons requesting retrieval is established and that person signs a receipt for the proposal. If the proposal is retrieved for modification, the sealed proposal must be resubmitted prior to the scheduled closing time for receipt of proposals. If the proposal is not resubmitted, it will be considered as withdrawn.

B. ADDENDA

Each proposal schedule shall include specific acknowledgment in the space provided of receipt of all addenda issued by the Owner during the advertisement period. Failure to acknowledge may result in the proposal being rejected as non-responsive.

C. MISTAKES; CORRECTIONS AND WITHDRAWAL OF PROPOSALS

After proposals are opened, if the low Offeror claims a serious and honest error in proposal preparation, and can support such claim with evidence satisfactory to the Owner, withdrawal of the proposal without forfeiture of the bid security will be permitted. As a condition of this release, the low Offeror will be prohibited from:

1. Subcontracting or furnishing labor or equipment on this project.
2. Bidding on any Cobb County System projects within ninety (90) days of release by Owner.

D. INTERPRETATIONS

No interpretation of the meaning of the drawings, specifications or other pre-proposal documents will be made to any Offeror orally. Every request for such interpretation should be in writing, addressed to the Owner, and in order to be given consideration must be received at

least seven days prior to the date fixed for the opening of proposals. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the request for proposals. All addenda so issued shall become a part of the Contract Documents.

Any questions concerning this request for proposals should be in writing via letter or facsimile, no later than **5:00 p.m. on July 20, 2010**, to:

Cobb County Purchasing Department
1772 County Services Parkway
Marietta, GA 30008-4021
FAX: (770) 528-1154
E-mail: purchasing@cobbcounty.org

E. SITE EXAMINATION

The Offeror, before making his proposal, shall examine the baseline specifications, available drawings, and the site and shall make such examinations on the ground as may be necessary to thoroughly familiarize themselves with the nature and extent of the proposed construction and with all local conditions affecting the work. The Offeror shall accept the premises in its present condition and carry out all work in accordance with the requirements of the specifications. The Owner will not be responsible for Offeror's errors and misjudgment nor for failure to obtain any information on local conditions or general laws or regulations pertaining thereto.

At the time of the opening of proposals, each Offeror will also be presumed to have read and to be thoroughly familiar with the Contract Documents (including all addenda), and the construction specifications. The failure or omission of any Offeror to examine any form, instrument, or document shall in no way relieve any Offeror from any obligation in respect to his proposal.

F. Notice of SPECIAL CONDITIONS;

All contracts and work associated with this project are subject to the terms and conditions of the American Reinvestment and Recovery Act of 2009 (ARRA) and the Energy Efficiency and Conservation Block Grant (EECBG) awarded to the County through which funding for this project is provided. The County's "Special Terms and Conditions of the ARRA and EECBG" are included incorporated in the RFP by inclusion in the Specifications, and shall be incorporated in the Design/Build contract. Bidders may also view the EECBG grant award and associated terms and conditions by viewing the EECBG link on <http://purchasing.cobbcountyga.gov/> to further familiarize themselves with the requirements of the grant.

G. LAWS AND REGULATIONS; LICENSING

The Offeror's attention is directed to the fact that all applicable Federal and state laws, county and municipal ordinances and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the Contract throughout, and they will be deemed to be included in the Contract the same as though herein written out in full.

The State of Georgia has requirements for the licensing of contractors engaged in specific types of construction, including general contracting, electrical, plumbing, and underground utility work [re: OCGA § 43-14]. Any contractor (or subcontractor of any tier) performing

regulated work on this project shall furnish proof of valid and current registration to the Owner. Similarly, the State requirements concerning local business licenses shall be met.

H. EXECUTION OF COMPETITIVE SEALED PROPOSALS

The Offeror, in signing his proposal on the whole or any portion of the work, shall conform to the following requirements:

1. Competitive Sealed Proposals, which are not signed by individuals providing said proposal shall have attached thereto a power of attorney evidencing authority to sign the proposal in the name of the person for whom it is signed.
2. Competitive Sealed Proposals, which are signed for a partnership shall be signed by all of the partners or by an attorney-in-fact. There should be attached to the proposal a power of attorney executed by the partners evidencing authority to sign the proposal.
3. Competitive Sealed Proposals, which are signed for a corporation shall have the correct corporate name thereof and the signature of the president or other authorized officer of the corporation manually written below the corporate name following the wording "By _____." The corporate seal shall also be affixed to the proposal.

I. NON-COLLUSION AFFIDAVIT

The Georgia statute concerning public works construction contracting requires that any person who procures such work by bidding or proposal shall make an oath in writing that he/she has not prevented or attempted to prevent competition in such bidding [OCGA § 36-91-21(d),(e)]. If the Design/Builder is a partnership, all of the partners and any officer, agent, or other person who may have represented or acted for them in bidding for or procuring the contract shall make the oath and complete the Affidavit. If the Design/Builder is a corporation, all officers, agents, or other persons who may have acted for or represented the corporation in bidding for or procuring the contract shall make the oath and complete the Affidavit. If such oath is false, the Contract shall be void, and all sums paid by the County on the Contract may be recovered by appropriate action.

J. AWARD OF CONTRACT

The Offeror to whom the Contract is being awarded will be required to execute the agreement and obtain the performance bond, payment bond and provide insurance certificates acceptable to the Owner within twenty-one calendar days from the date when the notice of award is issued to the Offeror. In case of failure of the Offeror to execute the agreement or provide insurance or meet bonding requirements, the Owner may consider the Offeror in default, in which case the bid security accompanying the proposal shall become payable to the Owner.

K. OWNERSHIP OF PROPOSAL DOCUMENTATION

Upon receipt of the Proposal by the Owner, the Proposal and all included documentation shall become the property of the Owner, without compensation to the Offeror, for disposition or usage by the Owner at its discretion. The Owner assumes no responsibility or obligation to firms providing proposals and will make no payment for any costs associated with the preparation or submission of proposals. All work, including but not limited to planning, programming, cost estimates and summaries, plans, specifications and other materials prepared by or for the firms proposing to the Owner under this Invitation for Proposals shall become the property of the Owner

L. CONTRACT PERFORMANCE BOND AND PAYMENT BOND

The Design/Builder will be required to furnish a contract performance bond and a payment bond executed by a surety company. This company must be listed in the latest issue of U.S. Treasury Circular 570, registered, and duly authorized to do business in the State of Georgia. The bond must be signed (or countersigned) by a local agent, each in an amount that is at least equal to one-hundred percent (100%) of the Contract Price, as security for the faithful performance of this contract and as security for the payment of all persons performing labor and furnishing material in connection with the Contract.

The surety shall be acceptable to the Owner and the bonds shall be executed on the County's bond forms which are included. In case of default on the part of the Design/Builder, all expenses incident to ascertaining and collecting losses under the bond, including both engineering and legal services, shall lie against the bond.

The Design/Builder will be required to provide the Owner a one-year guarantee covering workmanship and materials of the project, or as provided for in the Specifications. The contract performance bond shall remain in force for 90 days from date of project acceptance by the Owner. The cost of this bond shall be paid by the Design/Builder.

M. INSURANCE PROOF OF COVERAGE

Prior to execution of Contract Documents, a certificate of insurance will be submitted to the Owner as required.

The **Design/Builder** shall procure and maintain for the duration of the Contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with performance of the work hereunder by the **Design/Builder**, his agents, representatives, employees, or subcontractors.

MINIMUM LIMITS OF INSURANCE

Design/Builder shall maintain limits no less than:

A. General Liability

\$2,000,000 General Liability combined single limit per occurrence, for bodily injury, personal injury, property damage, contractual liability, and broad form property damage.

B. Automobile Liability

\$1,000,000 Automobile Liability combined single limit per accident, for bodily injury and property damage, including owner, non-owned, hired, leased or rented vehicles.

C. Workers' Compensation and Employers' Liability

\$100,000 Employers' Liability limit per accident and Worker's Compensation limits as required by the Labor Code of the State of Georgia.

D. Builder's Risk

Full amount of cost proposal minus the amount of Design and Construction Management services. Cobb County should be listed as a Loss Payee under this insurance.

E. Professional Liability

\$1,000,000 Professional Liability Insurance to cover damages resulting from errors or omissions of the engineers and/or architects on the Design/Builder's project team.

F. Umbrella Policy

\$2,000,000 limit for a combined single limit

DEDUCTIBLES AND SELF-INSURED RETENTION

Any deductibles or self-insured retentions must be declared to and approved by the **Owner**. At the option of the **Owner**, either the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the **Owner**, its officers, officials, or employees; or the **Design/Builder** shall procure a bond guaranteeing payment of losses and related investigations, claims administration and defense expenses.

OTHER INSURANCE PROVISIONS

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

A. General Liability and Automobile Coverage

1. The **Owner**, its officers, officials, employees, and volunteers are to be covered as additional named insureds as respects liability arising out of activities performed by or on behalf of the **Design/Builder**; products and completed operations of the **Design/Builder**; premises owned, occupied or used by the **Design/Builder**; or automobiles owned, leased, hired or borrowed by the **Design/Builder**.

The coverage shall contain no special limitation on the scope of protection afforded to the **Owner**, its officers, officials, employees, or volunteers. Nothing in this paragraph shall be construed to require the **Design/Builder** to provide liability insurance coverage to the **Owner** for claims asserted against the **Owner** for its sole negligence.

2. Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the **Owner**, its officers, officials, employees, or volunteers.

3. The **Design/Builder's** insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

B. Workers' Compensation and Employers' Liability Coverage

The insurer shall agree to waive all rights of subrogation against the **Owner**, its officers, officials, employees, and volunteers for losses arising from work performed by the **Design/Builder** for the **Owner**.

C. Builder's Risk

The **Design/Builder** shall secure all-risk type of builder's risk insurance covering work performed under the Contract, and materials, equipment, expedited deliveries or other items to be incorporated therein, while the same are located at the construction site, stored off-site, or at the place of manufacture. The policy shall cover not less than losses due to fire, flood, explosion, hail, lightning, weather, vandalism, malicious mischief, wind, collapse, riot, aircraft, smoke or other cataclysmic events, until the date of final acceptance of the work.

The making of progress payments to the **Design/Builder** shall not be construed as relieving the **Design/Builder** or his subcontractors or the insurance company or companies providing the coverage described herein of responsibility for loss or direct physical loss, damage or destruction occurring prior to final acceptance.

D. All Coverage

Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the **Owner**.

ACCEPTABILITY

Insurance is to be placed with insurers with a Best's rating of no less than A.VII, or acceptable to the **Owner**.

VERIFICATION OF COVERAGE

A. The **Design/Builder** shall furnish the **Owner** with original Certificates of Insurance, each with **original endorsements** affecting coverage required by this clause. The certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The name of the Insured on the Certificate must exactly match the name on the Agreement/Contract and on the Design/Builder's corporate seal.

Each certificate must have an original signature in blue ink or a stamped signature in blue ink. Photocopies are not acceptable.

B. The Certificates must include the Cobb County Property Management Project Name and Project Number. The Certificate Holder must be shown as:

Cobb County Board of Commissioners
Cobb County, Georgia
Attention: Cobb County Property Management
57 Waddell Street
Marietta, GA 30060

C. The certificates and endorsements naming additional insureds and indicating required waivers are to be submitted with the executed Agreement/Contract and Performance and Payment Bonds, and shall be approved by the **Owner** before work commences. The **Owner** reserves the right to require complete, certified copies of all required insurance policies at any time.

D. The endorsements on the certificates must read as follows:

1. The certificate for All Coverage shall include the following Cancellation endorsement, worded exactly as follows: *"Should any coverage be suspended, voided, cancelled or, reduced in coverage or in limits, thirty (30) days prior written notice delivered by certified mail, return receipt requested, will be given to the Certificate Holder."*

2. The certificate for General Liability and Automobile coverage shall include the following endorsement, worded exactly as follows: *"Owner, its officers, officials, employees and volunteers are covered as additional insureds as respects liability arising out of actions performed by or on behalf of the Design/Builder; products and completed operations of the Design/Builder; premises owned, occupied or used by the Design/Builder; or automobiles owned, leased, hired or borrowed by the Design/Builder."*
3. The certificate for Worker's Compensation and Employers' Liability coverage shall include the following endorsement, worded exactly as follows: *"The insurer agrees to waive all rights of subrogation with respect to Worker's Compensation and Employers' Liability Coverage against the Owner, its officers, officials, employees, and volunteers for losses arising from work performed by the Design/Builder for the Owner."*

SUBCONTRACTORS

Design/Builder shall include all subcontractors as insured under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverage for subcontractors shall be subject to all of the requirements stated herein.

Conflict of Interest Statement

As a duly authorized representative of the firm _____

I, _____ with the title _____ certify

that to the best of my knowledge no circumstances exist that will cause a conflict of interest in performing services for Cobb County Government, that no employee of Cobb County, nor any public agency official or employee affected by this Request for Proposals has any pecuniary interest in the business of this firm, associates or consultants of this firm, or the firm's parent firm, subsidiary, or other legal entity of which this firm is a part, and that no person associated with or employed by this firm has any interest that would conflict in any way, manner or degree with the performance of services for Cobb County Government.

Date: _____

Company Name: _____

Authorized Representative Name: _____

Title: _____

Signature: _____

Officer's Oath

As a duly authorized representative of the firm involved in the bidding for or procuring the contract _____

I, _____ with the title _____ certify that I did not prevent or attempt to prevent competition in such proposals by any means whatsoever. Nor did I prevent or endeavor to prevent anyone from making a proposal therefore by any means whatsoever, or induce another to withdraw a proposal for the work.

Date: _____

Company Name: _____

Authorized Representative Name: _____

Title: _____

Signature: _____

Compliance with Georgia Security and Immigration Compliance Act (Effective 7/1/10)

BACKGROUND

Pursuant to the “Georgia Security and Immigration Compliance Act,” Cobb County cannot enter into a contract for the physical performance of services unless the contractor registers and participates in the federal work authorization program to verify information of all newly hired employees or subcontractors. Neither may any contractor or subcontractor enter a contract with the county in connection with the physical performance of services unless the contractor and/or subcontractor registers and participates in the federal work authorization program to verify information of all new employees. O.C.G.A. § 13-10-91.

Before any bid for the physical performance of services is considered, the bid must include a signed, notarized affidavit from the contractor attesting to the following: (1) the affiant has registered with and is authorized to use the federal work authorization program; (2) the user ID number and date of authorization for the affiant; and (3) the affiant is using and will continue to use the federal work authorization program throughout the contract period. O.C.G.A. § 13-10-91 (b) (1). Affidavits shall be maintained for five years from the date of receipt. O.C.G.A. § 13-10-91 (b) (1).

Upon contracting with a new subcontractor, a contractor or subcontractor shall, as a condition of the contract or subcontract, provide Cobb County with notice of the identity of any and all subsequent subcontractors hired or contracted by that contractor or subcontractor within five (5) business days of entering into a contract or agreement for hire with any subcontractor. Such notice shall include an affidavit including the subcontractor’s name, address, user ID number, and date of authorization to use the federal work authorization program. O.C.G.A. § 13-10-91 (b) (3).

Based upon the County’s experience and desire for full compliance, no work may be commenced by any subsequent subcontractor prior to notice being received by the County. Moreover, the County requires the preparation of the Immigration Compliance Certificate prior to the commencement of any work.

DEFINITIONS

Affidavit – a written statement made or taken under oath before an officer of the court or a notary public or other person who duly has been authorized so to act.

Affiant – the person who makes and subscribes to a statement made under oath (affidavit).

Physical Performance of Services – the building, altering, repairing, improving, or demolishing of any public structure or building or other public improvements of any kind to public real property, including the construction, reconstruction, or maintenance of all or part of a public road; or any other performance of labor for a public employer under a contract or other bidding process.

PROCEDURE & REQUIREMENTS
(Effective 7/1/10)

1. Bid Documents: Bid documents should contain information regarding the contract language requirements described below.
2. Responsive Bid Documents: Responsive bid documents must include a signed, notarized affidavit from the contractor in the form attached. If the affidavit is not submitted **at the time of the bid**, the applicant will be **disqualified**.

This affidavit must be signed, notarized and submitted with any bid requiring the performance of physical services. If the affidavit is not submitted at the time of the bid, bid will be determined non-responsive and will be disqualified.

3. Contract Language: Affirmative language shall be contained in agreements for the performance of services to cover all statutory and County requirements; such language shall require:
 - (a) That affidavits in the form attached be executed from a contractor (and any subcontractors, regardless of tier) showing compliance with the requirements of O.C.G.A. § 13-10-91 at the time a contract for the performance of physical services is executed. Such affidavits should be attached to the contract and/or subcontracts.
 - (b) That the contractor will be responsible for securing affidavits, and submitting them to the County, for any subcontractors (regardless of tier) employed or retained for work under the contract.
 - (c) That the contractor (and any subcontractors, regardless of tier) will fully comply with the requirements for submitting Immigration Compliance Certification (as discussed below);
 - (d) That failure to comply with any of the requirements and procedures of the County (i.e., failure to timely supply required affidavits or compliance certification documents; failure to utilize federal work authorization procedures; failure to permit or facilitate audits or reviews of records by County officials upon request; and/or failure to continue to meet any of the statutory or County obligations during the life of the contract) shall constitute a material breach of the agreement and shall entitle the County to dismiss any general contractor, subcontractor, or sub/subcontractor (irrespective of tier) for failing to fully comply with these requirements.
 - (e) That upon notice of a material breach of these provisions, the contractor (or subcontractor, regardless of tier) shall be entitled to cure the breach within ten (10) days and provide evidence of such cure. Should the breach not be cured, the County shall be entitled to all available remedies, including termination of the contract and damages.
4. Immigration Compliance Certification: Prior to commencing work under any contract for the physical performance of services, the contractor shall complete the “IMMIGRATION COMPLIANCE CERTIFICATION” form attached hereto and submit the same to the County.
Prior to allowing any other subcontractor to perform work under the contract, the contractor shall obtain a completed “IMMIGRATION COMPLIANCE CERTIFICATION” from each subcontractor (regardless of tier) and submit the same to the County.

FORM ATTACHMENTS:

1. CONTRACTOR AFFIDAVIT & AGREEMENT
2. SUBCONTRACTOR AFFIDAVIT & AGREEMENT
3. IMMIGRATION COMPLIANCE CERTIFICATION

CONTRACTOR AFFIDAVIT & AGREEMENT
(Effective 7/1/10)

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 contracting with Cobb County, Georgia, has registered with, is authorized to use, and is participating in a federal work authorization program (an electronic verification of work authorization program operated by the U.S. Department of Homeland Security or any equivalent federal work authorization program operated by the U.S. Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA)). The undersigned contractor further attests that it will continue to use the federal work authorization program throughout the contract period.

The undersigned further agrees that should it employ or contract with any subcontractor(s) or should its subcontractor(s) employ other subcontractor(s) for the physical performance of services pursuant to the contract with Cobb County, Georgia, the contractor or subcontractor will:

- (1) Notify the County within five business days of entering into a contract or agreement for hire with any subcontractor(s);
- (2) Secure from any subcontractor(s) and/or their subcontractor(s) verification of compliance with O.C.G.A. § 13-10-91 on the attached Subcontractor Affidavit (EXHIBIT A) prior to the commencement of any work under the contract/agreement;
- (3) Provide the subcontractor(s) with legal notice that Cobb County, Georgia, reserves the right to dismiss any contractor or subcontractor for failing to provide the affidavit and/or for failure to comply with the requirements referenced in the affidavit;
- (4) Maintain records of such compliance and provide a copy of each such verification to Cobb County, Georgia, at the time the subcontractor(s) is retained to perform such services or upon any request from Cobb County, Georgia; and
- (5) Maintain such records for a period of five (5) years.

EEV/Basic Pilot Program User ID Number

BY: _____
Authorized Officer or Agent
[Contractor Name]

Contractor Business Name

Printed Name

Date

SWORN AND SUBSCRIBED
BEFORE ME ON THIS THE
____ DAY OF _____, 201__

Notary Public Commission Expires: _____

This affidavit must be signed, notarized and submitted with any bid requiring the performance of physical services. If the affidavit is not submitted at the time of the bid, bid will be determined non-responsive and will be disqualified.

EXHIBIT A

SUBCONTRACTOR AFFIDAVIT & AGREEMENT
(Effective 7/1/10)

By executing this affidavit, the undersigned subcontractor 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 Cobb County, Georgia, has registered with, is authorized to use, and is participating in a federal work authorization program (an electronic verification of work authorization program operated by the U.S. Department of Homeland Security or any equivalent federal work authorization program operated by the U.S. Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA)). The undersigned contractor further attests that it will continue to use the federal work authorization program throughout the contract period.

The undersigned further agrees that should it employ or contract with any subcontractor(s) or should its subcontractor(s) employ other subcontractor(s) for the physical performance of services pursuant to the contract with Cobb County, Georgia, the undersigned subcontractor will:

- (1) Notify the County within five business days of entering into a contract or agreement for hire with any subcontractor(s);
- (2) Secure from any subcontractor(s) and/or their subcontractor(s) verification of compliance with O.C.G.A. § 13-10-91 on the attached Subcontractor Affidavit. (EXHIBIT A) prior to the commencement of any work under the contract/agreement;
- (3) Provide the subcontractor(s) with legal notice that Cobb County, Georgia, reserves the right to dismiss any contractor or subcontractor for failing to provide the affidavit and/or for failure to comply with the requirements referenced in the affidavit; and
- (4) Maintain records of such compliance and provide a copy of each such verification to Cobb County, Georgia, at the time the subcontractor(s) is retained to perform such services or upon any request from Cobb County, Georgia; and
- (5) Maintain such records for a period of five (5) years.

EEV/Basic Pilot Program User ID Number

BY: Authorized Officer or Agent
[Subcontractor Name]

Subcontractor Business Name

Printed Name

Date

SWORN AND SUBSCRIBED
BEFORE ME ON THIS THE
____ DAY OF _____, 201__

Notary Public Commission Expires: _____

IMMIGRATION COMPLIANCE CERTIFICATION
(To be completed by Contractors and all Subcontractors)
(Effective 7/1/10)

I certify to the Cobb County Board of Commissioners that the following employees will be assigned to:

(Project Name/Description)

<hr/>	<hr/>	<hr/>

I further certify to Cobb County, Georgia the following:

- The E-Verify program was used to verify the employment eligibility of each of the above-listed employees hired after the effective date of our contract to use the program;
- We have not received a Final Nonconfirmation response from E-Verify for any of the employees listed.
- If we receive a Final Nonconfirmation response from E-Verify for any of the employees listed above, we will immediately terminate that employee's involvement with the project.
- I have confirmed that we have an I-9 on file for every employee listed above and that to the best of my knowledge all the I-9's are accurate.
- To the best of my knowledge and belief, all of the employees on the above list are legally authorized to work in the United States.
- If any other employee is assigned to this Cobb County project, a certification will be provided for said employee prior to the employee commencing work on the project.

To the best of my knowledge and belief, the above certification is true, accurate and complete.

Sworn to by:

Contractor Name & Address:

Signature of Officer

Contractor Name & Address

Printed Name/Title

Contractor Name & Address

Date

Contractor Name & Address

SWORN AND SUBSCRIBED
BEFORE ME ON THIS THE
____ DAY OF _____, 201__

Notary Public
Commission Expires: _____

Disadvantaged Business Enterprises (DBE): The following provisions should be carefully read to determine applicability to your business.

Cobb County Government encourages the participation of all businesses in offering their services and/or products. The Cobb County Government has the goal to fairly and competitively procure the best product at the most reasonable cost.

A Disadvantaged Business Enterprise (DBE) is generally defined as a Female, Black American, Hispanic American and any other minority owned business. The Federal Government has long had program in place to ensure participation of DBE vendors and suppliers. The State of Georgia has established a similar program whereby DBE firms are defined, certified and made known. This effort is managed by the Georgia Department of Transportation (GDOT). More information can be obtained from GDOT web site:

1. <http://www.dot.state.ga.us/eo-div/index.shtml>

The Cobb County Government addresses DBE business participation (frequency and dollar value) in the following ways:

1. Cobb County wishes to identify all DBE participation; both at the contractor and sub-contractor levels in the following ways.
 - a. DBE businesses are requested to identify such status at the time they register as a vendor.
 - b. DBE businesses are requested to identify themselves at the time they propose to do business. Please complete **EXHIBIT B** if applicable and return with bid submittal.
 - c. All businesses will receive with each Purchase Order an instruction sheet for use of the furnished *Cobb County Government DBE Participation Report*, **EXHIBIT C**. Businesses are requested to complete this report and submit it with each invoice for the time period billed.
2. Cobb County has established a Disadvantaged Business Enterprise Plan in accordance with the regulations of the U.S. Department of Transportation (U. S. Department of Transportation (USDOT), 49 CFR Part 26.) The Cobb County Department of Transportation is the lead agency for implementing the USDOT DBE Program for the County.

The Plan applies only to projects which are clearly indicated by the County.

EXHIBIT B

DISADVANTAGED BUSINESS ENTERPRISE (DBE) IDENTIFICATION FORM

A Disadvantaged Business Enterprise (DBE) is generally defined as a Female, Black American, Hispanic American and any other minority owned business. If your firm is classified as a Disadvantaged Business Enterprise (DBE), please complete this form and submit with bid response or send to:

Cobb County Purchasing Department
Attn: Mr. Rick Brun, Purchasing Director
1772 County Services Parkway
Marietta, GA 30008
Fax: 770-528-1154
Email: purchasing@cobbcounty.org

Name of Firm: _____

Address: _____

Telephone: _____

Fax: _____

Email: _____

MBE Certification Number: _____

Name of Organization Certification _____

This information is acquired for informational purposes only and will have no bearing on the award unless otherwise stated

Instructions for Completing Exhibit C
Disadvantaged Business Enterprise (DBE)
Participation Report

All Cobb County Government contractors or vendors are requested to complete a report descriptive of any DBE subcontractor involvement in work for which the government is making payment. If otherwise specified in an RFP/ITB or contract, additional reporting forms may be required as well.

The objective of this request is to assist in the identification of Disadvantaged Business Enterprise (DBE) business participation with the Cobb County Government and to quantify that participation.

The Cobb County Government does not administer a DBE Certification Program. The principle certification agency for the State of Georgia is the Georgia Department of Transportation. As a Contractor/Vendor you are not responsible for verification of any DBE Certification information of your subcontractor.

*** **Instructions** ***

1. Contractor/Vendor is furnished the one-page ***DBE Participation Report*** form with each Cobb County Government-issued Purchase Order.
2. Contractor/Vendor completes this form for each billing period and attaches it to the invoice to then be sent to the Cobb County Government.
3. Upon receipt of a Contractor/Vendor invoice, County staff should simply separate the completed DBE form and transmit to:

Cobb County Purchasing Department,
Attn.: DBE Report

A Disadvantaged Business Enterprise (DBE) is a firm that is under the control of someone in an ownership position (at least 51%) that:

1. Has membership in one or more of the following groups: Female, Black American, Hispanic American, Native American, Subcontinent Asian American and Asian-Pacific America. There may be other groups that may be eligible to be certified as DBE;
2. Is a U.S. citizen or lawfully admitted permanent resident of the U.S.;
3. Has a personal net worth which does not exceed \$750,000; and,
4. The business meets the Small Business Administration's size standard for a small business and does not exceed \$17.42 million in gross annual receipts;
5. The business is organized as a for-profit business.
6. The business may also be DBE eligible as a certified U.S. Small Business Administration 8(a) program.

EXHIBIT C
Cobb County Government Disadvantaged
Business Enterprise Participation Report

PLEASE keep this blank form to make copies for actual use as needed. Also, please print or type in the form. ←

Submitted by: _____ Period Invoiced: _____
Name of Prime Contractor/Vendor **From/To:**

Cobb County Project Name: _____ Bid or P.O. Number: _____

Cobb County Department or Agency receiving service or product: _____

Description of Purchased Service/Product: _____

Full Contracted Amount: \$ _____ Payment amount requested at this time: _____

1. Are YOU, the Prime Contractor or Vendor a DBE business? YES _____ NO _____

2. Please provide the following information for each subcontractor participating during this reporting period:

Subcontractor Business Name	Type Service or Product Supplied	Subcontractor Business/Contact Tel. Number	Actual Dollar Value of Subcontractor Participation this Reporting Period
			\$
			\$
			\$
			\$
			\$
			\$
			\$

Submitted by: _____
Printed Name

Title or position: _____

Signature of Authorized Representative

Date Completed: _____

County Departments: Please send this completed form to the Cobb County Purchasing Department, ATTN: DBE Report

PAYMENT BOND

Bond Number: _____

KNOW ALL MEN BY THESE PRESENTS, that we, _____ as Principal, hereinafter called "**Contractor**", and _____, a corporation duly organized under the laws of the State of _____ listed in the latest issue of U.S. Treasury Circular 570, and registered in State of Georgia, as Surety, hereinafter called "**Surety**", are held and firmly bound unto Cobb County, Georgia, hereinafter called "**Owner**", in the sum of _____ (in words), (\$ _____) (in figures), for the payment of which sum, well and truly to be made, the **Contractor** and **Surety** bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the **Contractor** has entered into a written contract dated _____, 20 _____ with the **Owner** for performance of _____ in accordance with drawings and/or specifications prepared by or for Cobb County which contract is by reference made a part of this bond by reference as if fully set forth herein, and is hereinafter referred to as the **Contract**.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if **Contractor** shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

- A. A claimant is defined as an entity having a direct contract with the **Contractor** or with a Subcontractor of the **Contractor** for labor, material, or both, used or reasonably required for use in the performance of the Contract, "labor and material" being construed to include but not limited to that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

- B. The **Contractor** and **Surety** hereby jointly and severally agree with the **Owner** that every claimant as herein defined who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be due claimant, and have execution thereon. The **Owner** shall not be liable for the payment of any judgment costs or expenses of any such suit.
- C. No suit or action shall be commenced hereunder by any claimant,
1. Unless claimant, other than one having a direct contract with the **Contractor**, shall have given written notice to any two of the following: the **Contractor**, the **Owner**, or the **Surety** above-named, within ninety (90) days after such claimant did or performed the last of the work of labor, or furnished the last of the materials for which said claim is made, stating with substantial specifics and accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the **Contractor**, **Owner** and/or **Surety**, at the addresses provided in the Contract or in this bond, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.
 2. After one (1) year from the completion of Contract and the acceptance by **Owner** of the work there under, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.
 3. Other than in a state court of competent jurisdiction in and or the county or of the state in which the project, or any part thereof, is situated.
- D. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by **Surety** of mechanics' liens which may be filed on record against said improvement, whether or not claim for the amount of such presented under and against this bond.
- E. PROVIDED FURTHER, that the said **Surety**, for value received hereby, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed there under or the specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

IN WITNESS WHEREOF, this instrument is executed in three (3) counterparts, each one of which shall be deemed an original, this _____ day of _____, 20__.

Attest:

By: _____

Attest:

By: _____

Principal/Contractor (SEAL)

Signature

Typed Name

Title

Surety (SEAL)

Signature of Attorney-in-Fact

Typed Name of Attorney-in-Fact

(Bond must not be dated prior to date of Agreement)

PERFORMANCE BOND

Bond Number: _____

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned as Principal, hereinafter called "**Builder**", and _____, a corporation duly organized under the laws of the State of _____, listed in the latest issue of U.S. Treasury Circular 570, and registered in the State of Georgia, as Surety, hereinafter called "**Surety**", are held and firmly bound unto Cobb County, Georgia, hereinafter called "**Owner**", in the sum of _____ (in words), (\$ _____)(in figures), for payment of which sum, well and truly to be made, the **Builder** and **Surety** bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the **Builder** has entered into a written contract dated _____, 20 ____ with **Owner** for the construction of _____ in accordance with drawings and/or specifications prepared by or for Cobb County which contract is made a part of this bond by reference as if set forth herein and is hereinafter referred to as the "**Contract**."

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if **Builder** shall promptly and faithfully perform said **Contract**, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

PROVIDED, FURTHER, that **Surety**, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed there under or the specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work or to the specifications.

Whenever **Builder** shall be, and declared by **Owner** to be in default under the Contract, the **Owner**, having performed **Owner's** obligations there under, the **Surety** may promptly remedy the default, or shall promptly:

1. Complete the **Contract** in accordance with its terms and conditions; or,
2. Obtain a bid or bids for completing the **Contract** in accordance with its terms, and conditions, and upon determination by the **Owner** and the **Surety** jointly of the responsible and responsive bidder, arrange for a contract between such bidder and **Owner**, and make available as work progresses (even though there should be default or a succession of defaults) under the contract or contracts of completion arranged under this paragraph sufficient funds to pay the cost of completion less the balance of the **Contract** price; but not exceeding, including other costs and damages for which the **Surety** may be liable hereunder, the amount set forth in the first paragraph hereof.

The term "balance of the contract price", as used in this paragraph, shall mean the total amount payable by **Owner** to **Builder** under the **Contract** and any amendments thereto, less the amount paid by **Owner** to **Builder**.

Any suit under this Bond must be instituted before the expiration of two (2) years from the date on which final payment under the **Contract** falls due

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 heirs, executors, administrators or successors of the **Owner**.

The **Surety** may only cancel this bond by first providing thirty (30) days written notice to **Owner** and Builder. Such cancellation shall not discharge the **Surety** from liability already accrued under this bond prior to the expiration of the thirty (30) day period.

IN WITNESS WHEREOF, this instrument is executed in four (4) counterparts, each one of which shall be deemed an original, this _____ day of _____, 20____.

Attest:

By: _____

Attest:

By: _____

Principal/Builder (SEAL)

Signature

Typed Name

President
Title

Surety (SEAL)

Signature of Attorney-in-Fact

Typed Name of Attorney-in-Fact

PROJECT SPECIFICATIONS

FOR

COBB COUNTY REQUEST FOR COMPETITIVE SEALED PROPOSALS

DESIGN / BUILD

ENERGY EFFICIENCY HVAC RETROFITS – 3 BUILDINGS:

COBB COUNTY ANIMAL CONTROL

COBB COUNTY PURCHASING HEADQUARTERS

COBB COUNTY'S "THE ARTS PLACE"

SEALED BID #10-5507

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SECTION 00300

BID SUMMARY and PROPOSER'S SUBMITTAL

PROJECT IDENTIFICATION:

DESIGN / BUILD

ENERGY EFFICIENCY HVAC RETROFITS – 3 COBB COUNTY BUILDINGS

COBB COUNTY ANIMAL CONTROL
COBB COUNTY PURCHASING HEADQUARTERS
COBB COUNTY'S "THE ARTS PLACE"

COBB COUNTY, GEORGIA

THIS BID IS ISSUED ON BEHALF OF THE COBB COUNTY BOARD OF COMMISSIONERS BY:

COBB COUNTY PROPERTY MANAGEMENT DEPARTMENT
57 WADDELL ST., MARIETTA, GEORGIA 30060
(HEREINAFTER CALLED OWNER)

1. The Bidder proposes and agrees, if this Bid is accepted, to enter into a Design/Build Agreement with Cobb County, Georgia in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid Form and the Agreement, and in accordance with the other terms and conditions of the Contract Documents.
2. Bidder accepts all of the terms and conditions of the Bidding Documents, including without limitation those dealing with the disposition of Bid Security.
3. In submitting this Bid, Bidder makes all representations required by the Instructions to Bidders and further warrants and represents that:
 - (a) Bidder has examined copies of all the Bidding Documents, the Advertisement for Bids, the Instructions to Bidders and of the following Addenda (receipt of all is hereby acknowledged):

No. _____	Dated _____	No. _____	Dated _____
No. _____	Dated _____	No. _____	Dated _____
 - (b) Bidder attended the mandatory pre-bid meeting and understands the extent of the work as explained during the job walk.
 - (c) Bidder has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing the Work.
 - (d) Bidder has studied carefully the details of the Contract Documents, which may affect the cost, progress, performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents.

- (e) As a courtesy to the Bidder, Cobb County has provided access to available historic drawings of the buildings and properties associated with this bid. Bidder acknowledges that Cobb County takes no responsibility for the accuracy of the drawings and that the bidder agrees to take responsibility for verifying the accuracy of all information on the drawings.
 - (f) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or a corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for himself any advantage over any other Bidder or over GENERAL CONTRACTOR.
4. Bidder agrees to complete the Work for the prices(s) indicated in the Bid Sheet which is included as Attachment A to this specification section.
 5. All bid items shall include all required labor, expenses, subcontract costs, permit fees, taxes, insurance, miscellaneous costs, overhead and profit to complete the work.
 6. **Bidder acknowledges that this project is funded using funds provided through the American Recovery and Reinvestment Act of 2009 (ARRA) through an Energy Efficiency and Conservation Block Grant (EECBG). Bidder agrees to full compliance with the terms and conditions of these funding sources as described in section 01000 of these specifications and elsewhere in this Bid.**
 7. Bidder agrees that the bid lump sum costs for bid items 3, 5, and 6 will be full payment for installation labor costs; all tools, materials and equipment used during installation but not a permanent part of the installed improvements; overhead; and profit, regardless of the actual installed quantities of materials and equipment.

Submitted on _____, 2010. Bidder is:

An Individual

By _____ (SEAL)
(Individual's Name)

doing business as _____

Business address: _____

Phone No.: _____

A Partnership

By _____ (SEAL)
(General Partner)

Business address: _____

Phone No.: _____

A Corporation

By _____ (SEAL)
(Corporation Name)

(State of Incorporation)

By _____
(Name of person authorized to sign)

(Title)
(Corporate Seal)

Attest _____
(Secretary)

Business address: _____

Phone No.: _____

A Joint Venture

By _____
(Name)

(Address)

Phone No.: _____

By _____
(Name)

(Address)

Phone No.: _____

By _____
(Name)

(Address)

Phone No.: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership and corporation that is a party to the joint venture should be in the manner indicated above).

END OF SECTION

SECTION 01000

SPECIAL TERMS AND CONDITIONS OF THE AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009 (ARRA) AND THE ENERGY EFFICIENCY AND CONSERVATION BLOCK GRANT (EECBG)

PART 1 GENERAL

This Section includes covers the Federal, State, and local provisions and requirements of the American Recovery and Reinvestment Act of 2009 (ARRA) and the Energy Efficiency and Block Grant (EECBG) program that constitute the funding sources for this project.

PART 2 SPECIAL TERMS AND CONDITIONS FOR ARRA and EECBG FUNDED PROJECTS

The following Special Terms and Conditions (ST&C-Bid) are incorporated in this bid and all resulting contracts and work orders. Submittal of a bid constitutes agreement by the Bidder to become familiar with and to comply with all terms and conditions in this section as well as elsewhere in bid and contract documents.

I. Compliance with ARRA and EECBG Funding and Contracting Requirements – General

A. Compliance Requirement by Bidders

This project is funded through an Energy Efficiency and Conservation Block Grant (EECBG) (Grant) provide under the American Recovery and Reinvestment Act of 2009 (ARRA), and is administered by the U.S. Department of Energy (DOE). Collectively, the terms and conditions of the EECBG and ARRA constitute the terms and conditions of the Grant.

1. Bidder Acknowledgement of Compliance

By submitting a bid, the Bidder hereby represents and warrants to and for the benefit of Cobb County and the United States Government that the Bidder agrees to:

- Familiarize themselves with, and comply with, all terms and conditions for ARRA and EECBG funded projects;
- Certify such compliance and provide documentation thereof upon request;
- Pass through these requirements to all subcontractors and, where applicable, to suppliers;
- Provide full and timely assistance upon request to Cobb County and other legal state and federal agencies and their designees as may be requested to demonstrate or confirm compliance with all bid and contract requirements and conditions.

2. Compliance Documents

The following documents specifying terms and conditions required for compliance with ARRA and EECBG are incorporated by reference:

- The American Recovery and Reinvestment Act of 2009
- 10 CFR 600 - all sections applicable to local governments. In particular, pay special attention to conditions in Subpart C – Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments.
- National Policy Assurances (version current at time of bid publication)

- The “Special Terms and Conditions to Cobb County EECBG Grant DE-EE0000803/000” (Grant ST&C), a copy of which is available online at <http://purchasing.cobbcountyga.gov/>

Bidders are directed to pay particular attention to the following sections of documents referenced above:

- 10 CFR 600-236, Purchasing, with special attention to paragraph (i)
- Grant ST&C paragraph 25 – compliance with Buy American requirements of ARRA
- Grant ST&C paragraph 27 and 29 – compliance with Davis-Bacon requirements of ARRA
- Grant ST&C paragraph 22 – special provisions for ARRA funded work

B. Bidder Acknowledgement Regarding Compliance Failure

In addition to all other remedies available to the Owner in the Bid and Contract documents, Bidder acknowledges that failure to comply with all terms and conditions in the ARRA and EECBG may constitute justification for withholding payment for services and materials up to and including the full value of any project funds withheld by the government of the United States.

C. Flowdown Requirement

Bidders must include all terms and conditions of this bid and all associated contracts in all subcontracts or awards resulting from this Bid as required by the referenced

D. Jobs Creation Reporting

Bidder agrees to provide information as requested by Owner to fulfill Owner’s responsibility to report jobs created with Grant funds.

E. Compliance with NEPA and Cobb County Waste Stream Management Plan

Cobb County has submitted a Waste Stream Management Plan to DOE as a condition of the EECBG. A copy of this plan is posted at <http://purchasing.cobbcountyga.gov/>. In addition to any other requirements contained or referenced in documents listed in section III-A herein, Bidder, by submitting a bid, indicates their familiarity with Cobb County’s Waste Stream Management Plan and agrees to adhere to the processes and procedures therein, and to provide documentation acceptable to the Owner of compliance.

II. Guidance and Emphasis Regarding ARRA and EECBG Funding and Contracting Requirements

Section I to these bid Special Terms and Conditions incorporates by reference the compliance requirements for this Bid and all subsequent contracts as required by the ARRA and EECBG grant conditions. The following discussion of selected compliance requirements is provided for emphasis, or for clarification or guidance on selected requirements. Should there be any conflict between these clarifications and the requirements of the source documents, the requirements of the source documents shall be applicable.

A. Access and Maintenance of Records

Bidder agrees that the terms Owner, County, or similar, as used in respect with requests made for records or documents necessary to ensure compliance with the ARRA and EECBG, shall include representatives of DOE, the US Inspector General, the US Comptroller General, their designees, or any other federal or state agencies and officials lawfully charged with ensuring compliance with the terms of this grant. Bidder agrees to respond to all such requests fully and in a timely manner so as not to delay Owner’s obligations for this grant.

Included in this obligation is compliance with the following grant conditions:

1. Information in Support of Recovery Act Reporting

Recipient may be required to submit backup documentation for expenditures of funds under the Recovery Act including such items as timecards and invoices. Recipient shall provide copies of backup documentation upon request by Owner.

2. Access to Records

With respect to funds made available as a result of this Bid, any representative of the Owner as defined herein is authorized:

(1) to examine any records of the contractor or grantee, any of its subcontractors or subgrantees, or any State or local agency administering such contract that pertain to, and involve transactions that relate to, the subcontract, subgrant, grant, or subgrant; and

(2) to interview any officer or employee of the contractor, grantee, subgrantee, or agency regarding such transactions.

3. Maintenance of Records

All records required for compliance with the expenditure of funds made available by the American Recovery and Reinvestment Act of 2009 shall be maintained and available for access as required for a minimum of three (3) years from date of final payment for work under this Contract and all other pending matters are closed, or longer should any of the applicable documents referenced in section III A above so require.

B. Contractor Registrations and Certification of Eligibility

Bidders acknowledge by submitting a bid that:

1. Registration in the Central Contractor Registration (CCR) and acceptance by the DOE of their status is a requirement for any contract award. Bidders must submit a current DUNS number with their bid, as well as either: (a) a current CCR registration number, or (b) in the absence of a CCR number, a certification that they will register in CCR in a timely manner upon Owner notification of intent to award, and that award may be withheld for failure to register or should they be rejected for work by any federal agency with authority to deny eligibility.

2. Neither the Contractor (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded DOE contracts or participate in DOE programs pursuant to 24 CFR Part 24; and

No part of this bid shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded DOE contracts or participate in DOE programs pursuant to 24 CFR Part 24.

C. Buy American – ARRA Section 1605

All goods and services to be provided through this Bid are being funded with monies made available by ARRA and such law contains provisions commonly known as "Buy American Requirements" that requires all of the iron, steel, and manufactured goods used in the project be produced in the United States unless a waiver of the requirements is approved by the Department of Energy.

It is the responsibility of the Bidder to ensure the following: (a) full reviewed and understanding of the Buy American Requirements, (b) that all of the iron, steel, and manufactured goods used in the project will be and/or have been produced in the United States in a manner that complies with the Buy American Requirements, (c) that should Bidder anticipate and propose any non-compliant iron, steel, and manufactured goods, Bidder must note specific exceptions in their bid and provide reference to an existing DOE waiver if any, or justification as required in ARRA Section 1605 to apply for a waiver, and (d) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or, if applicable, assistance in submitting a Bidder requested waiver from this requirement as may be requested by Cobb County or other legal state or federal agency.

Bidders shall complete and submit the Owner provided Contractor and Supplier Certification Document(s) for themselves, and shall obtain and submit the same from any subcontractors and suppliers, in a timely manner upon request by the Owner. **(See Attachment A to this section).**

Notwithstanding the waiver provisions allowed in the ARRA, a Bidder request for exceptions to Buy American Requirements shall be sufficient for Cobb County, at its sole discretion, to reject a bid as non-responsive.

D. Davis-Bacon Act and Contract Work Hours and Safety Standards Act

Compliance with the Davis-Bacon Act, the Contract Work Hours and Safety Standards Act, and the Copeland Act, all as stipulated in the Compliance Documents in section III-A herein, apply to this project.

Under the provisions of the Act, contractors or their subcontractors are to pay workers employed directly upon the site of the work no less than the locally prevailing wages and fringe benefits paid on projects of a similar character as determined by the U.S. Dept. of Labor Wage Determination applicable on the bid issuance date for the construction type and work location. **For this project, General Decision Number: GA100255 05/28/2010 GA255, is applicable.**

By submitting a bid, the Bidder hereby represents and warrants to and for the benefit of Cobb County and the United States Government that (a) the contractor has reviewed and understands the requirements of the Davis-Bacon Act, the Contract Work Hours and Safety Standards Act, and the Copeland Act as they apply hereto, (b) has reviewed the applicable Wage Determination referenced herein, and (c) will fully conform with the applicable Wage Determination and all requirements applicable to this bid and resulting contract(s).

E. Protecting State and Local Government and Contractor Whistleblowers.

The requirements of Section 1553 of the ARRA specify protections, actions and remedies regarding treatment of any employee of state or local governments or their contractors or subcontractors for disclosing, including a disclosure made in the ordinary course of an employee's duties, information that the employee believes is evidence of gross management of an agency contract or grant relating to covered funds, a gross waste of covered funds, a substantial and specific danger to public health or safety related to the implementation or use of covered funds, an abuse of authority related to the implementation or use of covered funds, or violation of law, rule, or regulation related to an agency contract (including the competition for or negotiation of a contract) or grant, awarded or issued relating to covered funds.

All parties to this agreement shall be responsible for compliance with all requirements and conditions of Section 1553 of the ARRA.

Requirement to Post Notice of Rights and Remedies: Any employer receiving covered funds under the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5, shall post notice of the rights and remedies as required therein. (Refer to section 1553 of the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5, www.Recovery.gov, for specific requirements of this section and prescribed language for the notices.)

G. False Claims Act

Recipient and sub-recipients shall promptly refer to the DOE or other appropriate Inspector General any credible evidence that a principal, employee, agent, contractor, sub-grantee, subcontractor or other person has submitted a false claim under the False Claims Act or has committed a criminal or civil violation of laws pertaining to fraud, conflict of interest, bribery, gratuity or similar misconduct involving those funds.

H. National Policy Assurances

National Policy Assurances in effect on date of award as published at http://management.energy.gov/business_doe/1374.htm are incorporated in these Special Terms and Conditions by reference.

I. Small and Minority Business Enterprises

The Bidder agrees to ensure that small and minority firms, women's business enterprises, and labor surplus firms (DBE firms) have the maximum opportunity to participate in the performance of contracts and subcontracts whenever possible per paragraph (e) of 10 CFR 600-236. In this regard, all contractors shall take necessary and reasonable steps in accordance with 10 CFR 600-236 to ensure these firms have the maximum opportunity to compete for and perform contracts. Contractors shall not discriminate on the basis of race, color, national origin or sex.

Bidder agrees to provide documentation of all DBE firms, including itself, participating in this contract. Bidder further agrees, upon request of the Owner, to provide a list of any DBE firms that were contacted for participation in this contract.

END OF SECTION

SECTION 01000 A

Manufacturer's Buy American Certification Compliance Statement

The Manufacturer (or designated manufacturer's representative) shall include this statement with all submittals for this project.

By this submittal, the Manufacturer hereby represents and warrants that all iron, steel, or manufactured goods represented in this submittal will be and/or have been produced in the United States in a manner that complies with the Buy American Requirements of Section 1605 of the American Recovery and Reinvestment Act of 2009 (ARRA), unless a waiver of the requirements is approved, and the Manufacturer will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support reporting requirements or a waiver of the Buy American Requirements, as may be requested by the Owner.

Project Name: _____

Signed: _____

By: _____

Print Name

Title: _____

Company: _____

Date: _____

SECTION 01000 A

Contractor Buy American Certification Compliance Statement

The Contractor shall execute and submit this statement prior to contract award for this project.

I understand this project is funded in whole or in part using funds provided through the American Recovery and Reinvestment Act of 2009 (ARRA), and that performance on this project requires full compliance with the conditions of this Act.

I hereby represent and warrant that all iron, steel, or manufactured goods used in this project will be and/or have been produced in the United States in a manner that complies with the Buy American Requirements of Section 1605 of the American Recovery and Reinvestment Act of 2009 (ARRA), unless a waiver of the requirements is approved, and I will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support reporting requirements or a waiver of the Buy American Requirements, as may be requested by the Owner.

I agree to require the Manufacturer of all products used on this project submit a Manufacturer's Buy American Certification with all product submittals unless a waiver of the requirements is approved.

I shall maintain records at the job site or, if no contractor office is maintained at the job site, at the project office of the supervisor overseeing this project, documenting of compliance with these requirements, to provide copies of such documents available to the Owner upon request, and to provide complete documentation to the Owner at the conclusion of the project.

Project Name: _____

Signed: _____

By: _____

Print Name

Title: _____

Company: _____

Date: _____

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 LOCATION OF WORK

- A. The work of this Contract is located at three buildings located in Cobb County, Georgia as follows:

Animal Control Building, 1060 Al Bishop Drive, Marietta, GA. 30008
Purchasing Department Headquarters, 1772 County Services Parkway, Marietta, GA. 30008
The Arts Place, 3330 Sandy Plains Road, Marietta, GA 30062

1.02 TERMINOLOGY USED IN SPECIFICATIONS

- A. As used in these Specifications:
1. Bid shall include Proposal;
 2. Bidder shall include Proposer or Contractor;
 3. Engineer shall apply to Contractor's Engineer or Owner in accordance with the guidance provided in below.
- B. Use of the term "engineer" and division of responsibilities

The responsibilities assigned to the engineer in these specifications and subsequent contract shall be performed separately or collectively to both the project design engineer retained by the Contractor ("design engineer") and the Owner's representative, depending on the responsibilities to be performed. The following guidelines are provided to distinguish responsibilities between the design engineer and the Owner's representative.

The contractor's design engineer shall have sole responsibility for all engineering services required to develop the final and complete project design prior to final Owner approval of the design.

Following acceptance by the Owner of the final design, all activities specified for the engineer shall be performed first by the design engineer who shall submit all reports, findings, etc. to the Owner's representative for review. Where engineer review and approval is specified for changes in specifications, products, work methods, etc., the design engineer shall present his recommendation to the Owner's representative who shall have final approval for any changes. The design engineer's submittals must contain sufficient detail and support documentation to allow the Owner to make the final decision on acceptance of any changes to the approved design.

Submittals from the Contractor's engineer must be made in a timely manner so as to allow the Owner time to review, approve and/or contest the recommendations without affecting the Contractor's work schedule. Should any work delay be caused by the design engineer's failure to provide needed information to the Owner in a timely manner, such delay shall be considered a Contractor caused delay and Contractor shall not be entitled to additional compensation or time.

C. Use of Brand Names and Buy American Compliance

1. Any reference to specific products and brands in these specifications are for reference only and should not be interpreted to restrict Bidders from considering other qualifying equipment from other manufacturers. Bidders may propose other products that are substantially similar and meet product specifications, subject to the approval of the Owner.
2. The Buy American requirements of this bid extend to all products, materials, and equipment (“Manufactured Goods”) used in this project. Any reference to specific products and brands in these specifications DO NOT infer the Manufactured Goods meet the Buy American requirements of this project. It is the responsibility of the Contractor and/or his suppliers to ensure all Manufactured Goods incorporated in this project meet the Buy American requirements, and to provide documentation sufficient to prove compliance.

1.03 OVERVIEW OF SCOPE OF WORK

- A. The work includes design, permitting and construction for the replacement of DX HVAC equipment and controls for the listed buildings.
- B. The scope of work for replacement of HVAC equipment includes calculations, design and replacement of all equipment identified in the REPLACEMENT EQUIPMENT TABLES (Paragraph 1.09 of this Section). All ancillary items that are required to provide fully operational systems are included in the scope. These include, but are not limited to ductwork modifications and connections, drain piping modifications and connections, gas piping modifications and connections, new controls installation and wiring, modifications to structural equipment supports and all equipment electrical connections.
- C. Controls
 1. The base bid shall be to provide internet accessible 7-day fully programmable thermostats for each DX system.
- D. The scope will also require that the Contractor maintain bonds as required in Specification Section 01740.

1.04 DESIGN AND SUBMITTAL PROCESS

- A. The Contractor shall perform the design in the following sequence and steps:
 1. Site visits to inspect facilities to establish existing conditions for design,
 2. Gathering of all additional data and information necessary for design
 3. Preparation of 35% design documents and submittal to Owner for review
 4. 35% review meeting with the Owner
 5. Preparation of 95% design documents
 6. 95% review meeting with Owner
 7. Preparation of final design documents
- B. Prior to beginning design, the Contractor shall inspect each facility to establish existing conditions and all data necessary for design.

- C. The 35% design submittal shall include the following components:
1. Catalog of existing equipment to be replaced.
 - (a) DX System(s) tonnage(s)
 - (b) Direct gas heater(s) heating capacity(s)
 - (c) Gas furnace(s) heating capacity(s)
 - (d) DX airflow(s) and cooling temperature(s)
 - (e) DX airflow(s) and heating temperature(s)
 2. Block Loads and Energy and Energy Cost Savings Projections
 3. Floor Plan Drawings
 - (a) Indicate locations of equipment replacements.
 - (b) Schedule of proposed replacement equipment.
 4. Proposed thermostat(s) and control system manufacturer and model.
 5. Manufacturer and model numbers of proposed equipment.

- D. The 95% design submittal shall include the following components:

1. All calculations and drawings.
2. Final draft drawings including at a minimum
 - (a) Equipment plans and details
 - (b) Equipment schedules
 - (c) Piping plans and details, where applicable.
 - (d) Control system plans and details
 - (e) Changes to existing piping to accommodate new equipment.
 - (f) Changes to existing duct to accommodate new equipment.
3. Final selections of equipment
 - (a) Manufacturer's data on HVAC equipment
 - (b) Manufacturer's data on controls equipment

- E. The final design submittal shall include all necessary calculations and drawings signed and sealed by a Professional Engineer who is licensed to practice in the State of Georgia.

1.05 PERMITTING

- A. The Contractor shall obtain all necessary permits for the proposed work and shall pay for all fees, permits, and inspections required.
- B. As part of the permitting process the Contractor is responsible for retaining a Professional Engineer licensed to practice in the State of Georgia to develop all calculations and drawings required for permitting. Where necessary, the Contractor's Professional Engineer shall sign and seal calculations and drawings.
- C. The Contractor is responsible for coordination of the timing of permitting. Permit revisions for changes in the proposed work shall be the responsibility of the Contractor.

1.06 DESIGN AND CONSTRUCTION CRITERIA AND STANDARDS

- A. Work shall be completed in accordance with permitting Authorities in Cobb County, Georgia, and with the latest editions of all applicable building Codes including but not limited to:
1. Georgia State Minimum Standard Building Code
 2. Georgia State Minimum Standard Mechanical Code
 3. Georgia State Minimum Standard Fire Code
 4. Georgia State Minimum Standard Plumbing Code
 5. Georgia State Minimum Standard Gas Code
 6. Georgia State Minimum Standard Electrical Code
 7. Georgia State Minimum Standard Energy Code
 8. ASHRAE Standard 90.1 (Energy Standard)
 9. ASHRAE Standard 62 (Ventilation Standard)
 10. NFPA 101, Life Safety Code
 11. NFPA 70, National Electric Code
 12. NFPA 72, National Fire Alarm and Signaling Code
 13. NFPA 90A Standard for the Installation of AC and Ventilating Systems
 14. SMACNA Duct Construction Manual
 15. International Existing Building Code, with Georgia Amendmentsa
- B. All work shall be completed in accordance with these specifications. Codes and Authorities shall take precedence where they conflict with the specifications.
- C. Final design drawings and as-built drawings are to be submitted to the owner. All design documentation, specifications, and calculations are to be submitted to the owner in Microsoft Word 2007 or Microsoft Excel 2007 format. Equipment cut sheets shall be submitted in PDF format.
- D. The following criteria must be met:
1. The Work consists of sizing and replacement of cooling and heating equipment in the forms of Packaged DX Rooftop AC/Heating Units, Packaged DX ground-level AC/Heating Units, and/or Split System DX AC/heating units. All ancillary items such as roof curbs, ductwork modifications and connections, drain piping modifications and connections, gas piping modifications and connections, new controls installation and wiring, modifications to structural equipment supports and all equipment electrical connections are to be included under the base bid Scope of Work to provide full and operational systems.
 - (a) Work shall include removal and disposal, or removal and salvage of all existing equipment and appurtenances in accordance with the Owner's Waste Stream Management Plan.
 - (b) Work shall include the design services of a structural engineer and development of technical specifications for structural modifications as needed.
 - (c) Where new equipment selection requires changes in existing equipment electrical feeds, Work shall include the design services of an electrical engineer and development of technical specifications for electrical modifications as needed.

- (d) Work shall include the design services of a mechanical engineer.
2. The proposed work shall be submitted for review and approval by the Owner and shall include equipment installation drawings at a minimum scale of ¼ inch per foot, and cut sheets for all materials and equipment.
 - (a) Design, drawings, cut sheets and calculation submittals shall be submitted for review and approval by the Owner or Owner’s Representative at each submittal phase.
 - (b) Design documentation to be submitted to the Owner. Final design drawings and as-built drawings are to be submitted to the owner. All design documentation, specifications, and calculations are to be submitted to the owner in Microsoft Word 2007 or Microsoft Excel 2007 format. Equipment cut sheets shall be submitted in PDF format.
 3. Prior to design, existing airflow and system static pressure circulated by each existing DX system shall be measured and recorded. Each new DX system shall be designed and sized to provide cooling and heating airflows and temperatures which match the loads calculated for the areas served by each DX system. Work shall include final testing of DX system.
 4. During construction, heating and cooling capability must be maintained for the buildings. Contractor must coordinate with Owner to schedule any temporary losses of cooling and/or heating capacity. Outages must be kept to a minimum.
 5. Equipment capacities listed in the EQUIPMENT REPLACEMENT TABLES (Paragraph 1.09 of this Section) are minimum cooling and heating capacities, as published in the listed equipment manufacturer’s literature, at the outdoor conditions for Atlanta, Georgia, as listed in the technical specifications.
 - (a) The new equipment sizing will be based on the Contractor’s design calculations as approved by the Owner. The equipment capacities and Manufacturer/Model selections are provided to serve as the Contractor’s basis for establishing bid prices for installation costs. The actual sizes and selections will be made by the Contractor during design through complete HVAC calculations for each unit to be replaced. The Contractor’s installation costs will be reimbursed based on the established bid prices. The Contractor’s material and equipment costs will be reimbursed at cost plus ten percent.

6. Minimum efficiencies of replacement equipment shall be as follows:

Description	Capacity	Cooling Efficiency	Heating Efficiency
Rooftop Package Unit	1-5 tons	15 SEER	N/A
Rooftop Package Unit	6-10 tons	13 SEER	N/A
Rooftop Package Unit	11-25 tons	12 EER	N/A
Rooftop Package Unit	26+ tons	11 EER	N/A
Rooftop Package Unit w/ direct fired gas heat	1-5 tons	15 SEER	80% AFUE
Rooftop Package Unit w/ direct fired gas heat	6-10 tons	13 SEER	78% AFUE
Rooftop Package Unit w/ direct fired gas heat	10-25 tons	12 EER	80% AFUE
DX split system, straight cool CU w/ gas furnace	1-5 tons	15 SEER	91% AFUE
DX split system, straight cool CU w/ gas furnace	6+ tons	11 EER	91% AFUE

1.07 INSPECTION AND ACCEPTANCE OF THE WORK

- A. The Contractor shall notify the Owner at least one week prior to reaching substantial completion and schedule a substantial completion inspection by the Owner.
- B. The Owner will perform a substantial completion inspection and create a substantial completion checklist.
 - 1. Owner shall inspect and record any evidences of: moisture due to equipment or pipe leaking or sweating, air leakage, loose or missing insulation, and any other problems with quality of work.
 - 2. During the substantial completion inspection of the building HVAC retrofits, the Contractor shall demonstrate controls functions of each piece of equipment. For each piece of equipment, Owner shall witness as Contractor demonstrates that randomly-selected functions totaling 15 percent of all functions tested and recorded during the test and balance procedure are repeatable during the inspection.

If more than one-third of the tests fall outside of 10-percent of the value recorded in the original test and balance procedure, the substantial completion report shall be marked as “failed.” The Contractor and Owner shall then re-schedule the substantial completion inspection

- C. Once the Contractor has completed the substantial completion checklist, he shall notify the Owner and schedule a final completion inspection.
- D. The Owner will perform a final completion inspection and, if necessary, create a second checklist of items to be rectified. During the final completion inspection of the systems, Owner shall witness as Contractor demonstrates that randomly-selected functions totalling 5-percent of all functions from the test and balance procedure are repeatable. Each of the measurements in this 5-percent demonstration must fall within 10-percent of the value recorded in the original test and balance procedure.
- E. The process described in Item D will be repeated until the Owner is satisfied that the work is final and all criteria are met. At that point, the Owner will issue a notice of final completion.

1.08 WORK COORDINATION, SCHEDULING AND SEQUENCE

- A. Criteria for work sequence and schedule are established in Section 01300, Work Coordination, Scheduling and Sequence.

1.09 REPLACEMENT EQUIPMENT TABLES

Animal Control

Description	Quantity	Cooling Capacity	Heating Capacity
DX split system, straight cool CU w/ gas furnace	1	1.5 ton	75 MBH
DX split system, straight cool CU w/ gas furnace	2	3 ton	80 MBH
DX split system, straight cool CU w/ gas furnace	3	5 ton	100 MBH
DX split system, straight cool CU w/ gas furnace	3	7.5 ton	100 MBH
Furnish and Install New Building Management System with controls for each Split System; Web Capability.	36 Analog, 36 Digital Points	Honeywell Excel LCBS	

Purchasing

Description	Quantity	Cooling Capacity	Heating Capacity
DX split system, straight cool CU w/ gas furnace	1	2 ton	100 MBH
DX split system, straight cool CU w/ gas furnace	3	3.5 ton	100 MBH
DX split system, straight cool CU w/ gas furnace	1	5 ton	100 MBH
DX split system, straight cool CU w/ gas furnace	1	7.5 ton	100 MBH
Furnish and Install New Building Management System with controls for each Split System; Web Capability.	36 Analog, 36 Digital Points	Honeywell Excel LCBS	

Arts Place

Description	Quantity	Capacity Cooling	Heating Capacity
Rooftop Package Unit w/ direct fired gas heat	4	10 ton	120 MBH
Provide Web Capable Programmable Thermostats	4		

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. All contract prices established in the Bid Sheet (Included in the Bid Form, Section 00300 of these specifications), including Unit Price Items, will be full compensation for all labor, materials, tools, equipment, incidentals, including permits and inspection fees, overhead, and profit necessary to complete the Work as shown on the Drawings and specified in the Contract Documents to be performed under this Contract.
- B. The items listed in this specification section refer to and are the same pay items established in the Bid Sheet. They constitute all of the pay items for the completion of the Work. Compensation for all services, equipment and materials necessary to complete the work of this contract shall be included in the prices stipulated for the lump sum and unit pay items listed herein.
- C. Each lump sum and unit price cost established in the Bid Sheet will be deemed to include overhead and profit.

1.02 PAY REQUEST PROCEDURES

- A. Requests for Payment will be submitted no later than the 25th day of each month, or more frequently if agreed between Contractor and Owner. All requests for payment shall be submitted to the Owner with complete cost backup where required (e.g., proof of obtaining permits, copies of purchased bonds, etc.). Such requests for payment shall be based upon the prices established in the Bid Sheet and the terms established in this Measurement and Payment Specification.
- B. Invoices shall be submitted on AIA (American Institute of Architects) standard invoice formats G702 and G703 which will detail percent complete for lump sum line items or, if allowed per the Contract, quantities and unit rates for unit price work and labor hours worked and total expenses for time and materials work.

1.03 MEASUREMENT AND PAYMENT TERMS

- A. Measurement and payment terms are established on Attachment A to this specification.
- B. Where a certified invoice is required in the measurement and payment terms, the invoice must be certified by the seller with the following signed statement - "{Insert Seller's company name here} certifies that the total amount of this invoice represents the actual total cost to {Insert Contractor's name here} for the equipment and material identified. No discounts, reimbursements or any other incentives will be provided to {Insert Contractor's name here}. {Insert Seller's company name here} also certifies that it has no financial interest in {Insert Contractor's name here} and {Insert Contractor's name here} has no financial interest in {Insert Seller's company name here}."

END OF SECTION

SECTION 01045

CUTTING AND PATCHING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. All cutting, coring, and rough patching shall be performed by the Contractor. Finish patching shall be the responsibility of the Contractor and shall be performed by trades qualified in the application of the particular finish.
- B. Provide all cutting, fitting and patching, required to complete the work or to:
 - 1. Make its several parts fit together properly.
 - 2. Uncover portions of the work to provide for installation of ill timed or improperly scheduled work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to requirements of Contract Documents.
 - 5. Remove samples of installed work as specified for testing.
 - 6. Provide penetrations of structural surfaces and materials for installation of equipment and electrical conduit.
 - 7. Provide penetrations of non-structural surfaces and materials for installation of piping, ductwork, equipment and electrical conduit. The determination of what is a nonstructural surface or material shall be made by the Engineer.
 - 8. Remove, install, or relocate materials or equipment.

1.03 SUBMITTALS

- A. Submit a written request prior to executing any cutting or alteration which is not shown or detailed on the contract documents or Owner approved design and/or work schedule prepared by Contractor which affects or requires:
 - 1. Cutting structural members.
 - 2. Holes drilled in beams or other structural members.
 - 4. Structural value or integrity of any element of the project.
 - 5. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
 - 6. Efficiency, operational life, maintenance or safety of operational elements.
 - 7. Visual qualities of sight-exposed elements.
- B. Request shall include:

1. Identification of the project.
 2. Description of affected work.
 3. The reason for cutting, alteration or excavation.
 4. Effect on work of Owner or any separate contractor, or on structural or weatherproof integrity of project.
 5. Description of proposed work:
 - a. Method and extent of cutting, patching, alteration, or excavation.
 - b. Trades who will execute the work.
 - c. Products proposed to be used.
 - d. Extent of refinishing to be done.
 6. Alternatives to cutting and patching.
 9. Related shutdown requests if required to do the work.
- C. Submit written notice to the Engineer designating the date and the time the work will be uncovered.

PART 2 PRODUCTS

2.01 MATERIALS

- C. Materials for finish patching shall be equal to those of adjacent construction. Where existing materials are no longer available, use materials with equivalent properties and that will provide the same appearance. The materials are to be approved by the Engineer prior to their use.

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect existing conditions of project, including elements subject to damage or to movement during cutting and patching.

3.02 PREPARATION

- A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of work.
- B. Protect surrounding materials and equipment prior to starting work.
- C. Contain and control cooling liquids and slurry produced by the cutting and coring operations.
- D. When the cutting or coring will result in the structure or equipment being exposed to provide adequate weather protection.

3.03 PERFORMANCE

- A. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surfaces to receive installation of repairs.
- C. All equipment and workplace safety shall conform to OSHA standards and specifications pertaining to plugs, noise and fume pollution, wiring and maintenance.
- E. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.
- F. Restore work which has been cut or removed; install new products to provide completed work in accordance with requirements of Contract Documents.
- G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
 - 1. For continuous surfaces, refinish to nearest intersection.
 - 2. For an assembly, refinish entire unit.
- H. Remove rubble and excess patching materials from the premises.

3.04 CORING

- A. All coring shall be performed in such a manner as to limit the extent of patching. Locate the rebar before coring to minimize cut throughs
- B. Coring shall be performed with an approved non-impact rotary tool with diamond core drills.
- C. Size of holes shall be suitable for pipe, conduit, sleeves, equipment or mechanical seals to be installed.
- D. Fit work to minimize space to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- F. All holes cut through concrete and masonry walls, slabs or arches shall be core drilled unless otherwise approved. All work shall be performed by mechanics skilled in this type of work.
- G. If holes are cored through floor slabs they shall be drilled from below where possible. If holes are drilled from above, provide protection and containment below the area being drilled to catch the plug and contain liquid and slurry.

3.05 CUTTING

- A. All cutting shall be performed in such a manner as to limit the extent of patching.
- B. Fit work to minimize space to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- C. Cutting shall be performed with a concrete saw and diamond saw blades of proper size.
- D. Provide for control of slurry generated by sawing operation on both sides of wall and from below if cutting a floor.

- E. When cutting a reinforced concrete wall or floor, the cutting shall be done so as not to damage the bond between the concrete and reinforcing steel left in structure. Cut shall be made so that steel neither protrudes nor is recessed from face of the cut.
- F. Adequate bracing of area to be cut shall be installed prior to start of cutting. Check area during sawing operations for partial cracking and provide additional bracing as required to prevent a partial release of cut area during sawing operations.
- G. Provide equipment of adequate size to remove cut panel.
- H. Saw cut concrete and masonry prior to breaking out sections.
- I. Install work at such time as to require the minimum amount of cutting and patching.
- J. All cutting of structural members shall be done in a manner directed by the Engineer.
- K. Cut opening only large enough to allow easy installation of the equipment, ducting, piping or conduit.
- L. When existing conduits or pipe sleeves are cut off at the floor line or wall line, they shall be filled with grout or suitable patching material.

3.06 PROTECTION

- A. Provide devices and methods to protect other portions of project from damage.
- B. Provide protection from elements for that portion of the project which may be exposed by cutting and patching work.

3.07 PATCHING

- A. Rough patching shall be such as to bring the cut or cored area flush with existing construction unless otherwise shown.
- B. Finish patching shall match existing surfaces as approved.
- C. Patching shall be of the same kind and quality of material as was removed.
- D. The completed patching work shall restore the surface to its original appearance or better.
- E. Patching of waterproofed surfaces shall render the area of the patching completely waterproofed to include the joint between the existing material and the patch.
- F. Equipment damaged during cutting and patching shall be replaced or repaired by the equipment manufacturer, at the Owner's sole discretion and at the expense of the Contractor doing the work.
- G. Repaint any damage to factory applied paint finishes using touch-up paint furnished by the equipment manufacturer. The entire damaged panel or section shall be repainted at the expense of the Contractor doing the work.
- H. Slurry or tailings resulting from coring or cutting operations shall be contained and vacuumed or otherwise removed from the area following drilling or cut.

- I. Equipment shall be protected against mechanical and water damage during cutting and patching. Provide protective covers or use other means such as temporary relocation to protect equipment that is at risk of damage from the cutting and patching
- J. Provide protection for existing equipment, utilities and critical areas against water or other damage caused by drilling operation.

END OF SECTION

SECTION 01300

WORK COORDINATION AND SCHEDULING

PART 1 GENERAL

1.01 WORK COORDINATION

- A. The work under this contract will occur in occupied buildings. The Contractor shall prepare a detailed Work Plan and Schedule to minimize disruption of building occupants, subject to Owner approval.

1.02 QUALIFICATIONS

- A. The submittal shall include the name of the individual on the Contractor's staff who will be responsible for the project schedule and for providing the required updating information.

1.03 SCHEDULE DEVELOPMENT

- A. A construction schedule shall be used to control the work of this Contract and to provide a definitive basis for determining job progress. The design, permitting and construction schedule shall be prepared and maintained by the Contractor. The Contractor and his/her subcontractors shall be responsible for cooperating fully with the Owner in effectively developing and updating the schedule.

- B. The schedule shall meet the following criteria:

1. The schedule shall include the following primary tasks:
 - (a) Data Gathering
 - (b) Design of Improvements
 - (c) Pre Construction Preparation
 - (d) Construction
 - (e) Closeout
2. Each of the primary tasks shall be broken into manageable secondary and tertiary tasks
3. At a minimum, the following items shall be shown as milestone tasks in the schedule:
 - (a) Submittals
 - (b) Review meetings
 - (c) Coordination meetings
 - (d) Equipment delivery schedules
 - (e) Start dates
 - (f) Substantial completion dates
 - (g) Final completion dates
4. Any critical paths shall be clearly identified.

- C. The Contractor shall include a draft schedule with Contractor's Bid.
- D. The Owner will review and provide comments on the schedule immediately upon issuance of Owner's Notice to Proceed. Contractor shall revise and resubmit a final schedule within 5 working days of receipt of Owner's comments.
- E. The Owner and the Contractor will then meet for a working session to agree upon the final schedule. This will be called the Approved Baseline Schedule
- F. The Contractor may not begin work until an Approved Baseline Schedule has been established.

1.04 PROGRESS REPORTING

- A. The Contractor shall update the schedule on a monthly basis to show progress against the Approved Baseline Schedule. However, if schedule slippage has occurred, the Owner may, at his discretion, require submittal of interim schedule updates.
- B. The Contractor shall provide a narrative with the schedule update that includes a description of the progress during the previous period in terms of completed activities, an explanation of each activity which is showing a delay, a description of problem areas, current and anticipated delaying factors and their estimated impact on performance of other activities and completion dates and an explanation of corrective action taken or proposed.
- C. The Contractor and the Owner will meet monthly to review the schedule or more frequently if required by Owner.
- D. Whenever it becomes apparent from the current schedule and project status report(s) that delays to the schedule have resulted and the contract completion date will not be met, or when so directed by the Owner, the Contractor shall take some or all of the following actions at no additional cost to the Owner and submit to the Owner for approval, a written statement of the steps intended to be taken to remove or arrest the delay to the critical path in the approved schedule.
 - 1. Increase construction manpower in such quantities and crafts as will substantially eliminate the backlog of work.
 - 2. Increase the number of working hours per shift, shifts per day, working days per week, the amount of construction equipment, or any combination of the foregoing, sufficiently to substantially eliminate the backlog of work.
 - 3. Reschedule activities to achieve maximum practical concurrence of accomplishment of activities and comply with the revised schedule.
- E. If, when so requested by the Owner, the Contractor fails to submit a written statement of the steps intended to take or should fail to take such steps as approved by the Owner, the Owner may direct the Contractor to increase the level of effort in man-power (trades), equipment and work schedule (overtime, weekend and holiday work, etc) to be employed by the Contractor in order to remove or arrest the delay to the critical path in the approved schedule and the Contractor shall promptly provide such level of effort at no additional cost to the Owner.

1.05 ADJUSTMENT OF CONTRACT SCHEDULE AND COMPLETION TIME

- A. If the Contractor desires to make changes in his/her method of operating which affect the approved schedule, he/she shall notify the Owner in writing stating what changes are proposed and the reason

for the change. If the Owner approves these changes, the Contractor shall revise the schedule and submit for approval without additional cost to the Owner. The schedule shall be adjusted by the Contractor only after prior approval of his/her proposed changes by the Owner. Adjustments may consist of changing portions of the activity sequence, activity durations, division of approved activities, or other adjustments as may be approved by the Owner. The addition of extraneous, non-working activities and activities which add unapproved restraints to the schedule shall not be approved.

- B. If the completion of any activity, whether or not critical, falls more than 100 percent behind its approved duration, submit for approval a schedule adjustment showing each such activity divided into two activities reflecting completed versus uncompleted work.
- C. Shop drawings which are not approved on the first submittal or within the schedule time and equipment which do not pass the specified tests shall be immediately rescheduled.
- D. The contract completion time will be adjusted only for causes specified in this Contract. In the event the Contractor requests an extension of any contract completion date, he/she shall furnish such justification and supporting evidence as the Owner may deem necessary to determine whether the Contractor is entitled to an extension of time under the provisions of this Contract. The Owner will, after receipt of such justification and supporting evidence, make findings of fact and will advise the Contractor in writing thereof. If the Owner finds that the Contractor is entitled to any extension of any contract completion date, the Owner's determination as to the total number of days extension shall be based upon the currently approved schedule and on all data relevant to the extension. Such data shall be included in the next updating of the schedule. Actual delays in activities which, according to the schedule, do not affect any contract completion date shown by the critical path in the network will not be the basis for a change therein.
- E. Each request for change in any contract completion date shall be submitted by the Contractor to the Owner within 30 days after the beginning of the delay for which a time extension is requested but before the date of final payment under this Contract. No time extension will be granted for requests which are not submitted within the foregoing time limit.
- F. From time to time it may be necessary for the contract schedule or completion time to be adjusted by the Owner to reflect the effects of job conditions, weather, technical difficulties, strikes, unavoidable delays on the part of the Owner or its representatives and other unforeseeable conditions which may indicate schedule adjustments or completion time extensions. Under such conditions, the Owner will direct the Contractor to reschedule the work or contract completion time to reflect the changed conditions and the Contractor shall revise his/her schedule accordingly. No additional compensation will be made to the Contractor for such schedule changes except for unavoidable overall contract time extensions beyond the actual completion of all unaffected work, in which case the Contractor shall take all possible action to minimize any time extension and any additional cost to the Owner. Available float time in the schedule may be used by the Owner as defined by the Owner, as well as by the Contractor.
- G. The Owner controls the float time in the approved schedule and, therefore, without obligation to extend either the overall completion date or any intermediate completion dates set out in the schedule, the Owner may initiate changes to the work that absorb float time only. Owner initiated changes that affect the critical path on the approved schedule shall be the sole grounds for extending (or contracting) said completion dates. Contractor-initiated changes that encroach on the float time identified in the approved schedule may be accomplished with the Owner's concurrence. Such changes, however, shall give way to Owner-initiated changes competing for the same float time.

END OF SECTION

SECTION 01600

DELIVERY, STORAGE AND HANDLING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section specifies the general requirements for the delivery handling, storage and protection for all items required in the construction of the work. Specific requirements, if any, are specified with the related item.

1.02 TRANSPORTATION AND DELIVERY

- A. Transport and handle items in accordance with manufacturer's instructions.
- B. Schedule delivery to reduce long term on-site storage prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from the Engineer.
- C. Coordinate delivery with installation to ensure minimum holding time for items that are hazardous, flammable, easily damaged or sensitive to deterioration.
- D. Deliver products to the site in manufacturer's original sealed containers or other packing systems, complete with instructions for handling, storing, unpacking, protecting and installing.
- E. No on-site storage shall be allowed without Owner's prior approval, such approval to include identification of on-site storage location. All items delivered to the site shall be unloaded and placed in a manner which will not hamper the Owner's normal operations and will not interfere with the flow of necessary traffic.
- F. Provide necessary equipment and personnel to unload all items delivered to the site.
- G. Promptly inspect shipment to assure that products comply with requirements, quantities are correct and items are undamaged. For items furnished by others (i.e. Owner, other Contractors), perform inspection in the presence of the Engineer. Notify Engineer verbally, and in writing, of any problems.
- H. If any item has been damaged, such damage shall be repaired at no additional cost to the Owner.

1.03 STORAGE AND PROTECTION

- A. Store and protect products in accordance with the manufacturer's instructions, with seals and labels intact and legible. Storage instruction shall be studied by the Contractor and reviewed with the Engineer by him/her. Instruction shall be carefully followed and a written record of this kept by the Contractor. Arrange storage to permit access for inspection.
- B. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- C. Cement and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All structural, miscellaneous and reinforcing steel shall be stored off the ground or otherwise to prevent accumulations of dirt or grease and in a position to prevent accumulations of

standing water and to minimize rusting. Beams shall be stored with the webs vertical. Precast concrete shall be handled and stored in a manner to prevent accumulations of dirt, standing water, staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in a manner to reduce breakage, cracking and spalling to a minimum.

- D. All mechanical and electrical equipment and instruments subject to corrosive damage by the atmosphere if stored outdoors (even though covered by canvas) shall be stored in a weathertight building to prevent injury. The building may be a temporary structure on the site if approved by Owner, or elsewhere, but it must be satisfactory to the Engineer. Building shall be provided with adequate ventilation to prevent condensation. Maintain temperature and humidity within range required by manufacturer.
1. All equipment shall be stored fully lubricated with oil, grease and other lubricants unless otherwise instructed by the manufacturer.
 2. Moving parts shall be rotated a minimum of once weekly to ensure proper lubrication and to avoid metal-to-metal "welding". Upon installation of the equipment, the Contractor shall start the equipment, at least half load, once weekly for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.
 3. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants shall be put into the equipment at the time of acceptance.
 4. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guaranty the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.
- E. All paint and other coating products shall be stored in areas protected from the weather. Follow all storage requirements set forth by the paint and coating manufacturers.

END OF SECTION

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SCOPE

The Contractor shall keep and maintain, at the job site, a copy of contract documents, marked up to indicate all changes made during the course of a project, as specified herein.

1.02 REQUIREMENTS INCLUDED

A. Contractor shall maintain a record copy of the following documents, marked up to indicate all changes made during the course of a project:

1. Contract Drawings

B. Contractor shall assemble copies of the following documents for turnover to the Engineer at the end of the project, as specified.

1. Field Orders, Change Orders, Design Modifications, and RFIs

2. Field Test records

3. Permits and permit close-outs (final approvals)

4. Certificate of Occupancy or Certificate of Completion, as applicable

5. Certificates of Compliance for materials and equipment

6. Record Shop Drawings

7. Samples

8. Material and Equipment Invoices with signed certifications from suppliers.

9. Buy American Certifications from Contractor or Suppliers, and equipment bills of lading or other documentation as required to comply with the Special Terms and Conditions for ARRA and EECBG funded projects as required in – Section 01000

C. RECORD DRAWINGS

1. The Contractor shall annotate (mark-up) the Contract Drawings to indicate all project conditions, locations, configurations, and any other changes or deviations that vary from the original Contract Drawings. The record information added to the drawings may be supplemented by detailed sketches, if necessary, clearly indicating, the WORK, as constructed.

2. These annotated Contract Drawings constitute The Contractor's Record Drawings and are actual representations of as-built conditions, including all revisions made necessary by change orders, design modifications, requests for information and field orders.

3. Record drawings shall be accessible to the Owner at all times during the construction period.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS AND SAMPLES

- A. Store documents and samples in Contractor's field office apart from documents used for construction.
 - 1. Provide files and racks for storage of the record documents.
 - 2. Provide locked cabinet(s) or secure storage space for storage of samples.
- B. File documents and samples in accordance with Construction Specifications Institute (CSI) format.
- C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.
- D. Make documents and sample available for inspection by the Owner at all times.
- E. Up-to-date Record Drawings are a pre-requisite of processing periodic monthly pay applications.

3.02 MARKING METHOD

- A. Use the color *Red* (indelible ink) to record information on the Drawings.
- B. Label each document "PROJECT RECORD" in neat large printed letters.
- C. Unless otherwise specified elsewhere, notations shall be affixed to hardcopies of documents.
- D. Record information contemporaneously with construction progress.
- E. Legibly mark drawings with as-built information:

3.03 RECORD INFORMATION COMPILATION

- A. Do not conceal any work until the required information is acquired.
- B. Items to be recorded include, but are not limited to:
 - 1. Location of internal utilities and appurtenances concealed in the construction – referenced to visible and accessible features.
 - 2. Field changes of dimensions and/or details
 - 1) Interior equipment and piping relocations.
 - 2) Architectural and structural changes, including relocation of doors, windows, etc.
 - 3) Architectural schedule changes.
- C. Changes made by Field Order, Change Order, design modification, and RFI.

- D. Details not indicated on the original Contract Drawings.

3.04 SUBMITTAL

- A. Upon substantial completion of the WORK and prior to final acceptance, the Contractor shall finalize and deliver a complete set of Record Documents to the Owner conforming to the construction records of the Contractor. The set of documents shall consist of corrected and annotated documents showing the as-installed equipment and all other as-built conditions not indicated on the Record Drawings.
- B. The information submitted by the Contractor into the Record Drawings and Record Documents will be assumed to be correct, and the Contractor shall be responsible for the accuracy of such information, and shall bear the costs resulting from the correction of incorrect data.
- C. Delivery of Record Drawings and Record Documents to the Owner will be a prerequisite to Final payment.
- D. The Contractor shall maintain a copy of all books, records, and documents pertinent to the performance under this Agreement for a period of five years following completion of the contract.

3.05 RETENTION

Contractor shall retain all project records for a period of three (3) years from final payment on the project in compliance with the Special Terms and Conditions for ARRA and EECBG funded projects as required in – Section 01000.

END OF SECTION

SECTION 01730

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section includes procedural requirements for compiling and submitting operation and maintenance data required to complete the project.

1.02 OPERATING MANUALS

- A. Provide operation and maintenance instructions for all electrical, mechanical, and instrumentation & controls equipment furnished under various technical specifications Sections.
- B. Separate manuals shall be provided for each facility covered in this project, and shall be arranged by Section number. Each manual shall contain the following:

1. Format and Materials

a. Binders:

- 1) Commercial quality three ring binders with durable and cleanable plastic covers
- 2) Maximum ring width capacity: 3 inches
- 3) When multiple binders are used, correlate the data into related consistent groupings/volumes.

b. Identification: Identify each volume on the cover and spine with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". Include the following:

- 1) Title of Project.
- 2) Identify the general subject matter covered in the manual
- 3) Identify structure(s) and/or location(s), as applicable
- 4) Specification Section number

c. 20 lb loose leaf paper, with hole reinforcement

d. Page size: 8-1/2 inch by 11 inch

e. Provide heavy-duty fly leaves (section separators), matching the table of contents, for each separate product, each piece of operating equipment, and organizational sections of the manual.

f. Provide reinforced punched binder tab; bind in with text.

- g. Reduce larger drawings and fold to the size of text pages - but not larger than 11 inches x 17 inches - or provide a suitable clear plastic pocket (with drawing identification) for such folded drawings/diagrams.

2. Contents:

- a. A table of contents/Index
- b. Specific description of each system and components
- c. Name, address, telephone number(s) and e-mail address(es) of vendor(s) and local service representative(s)
- d. Specific on-site operating instructions (including starting and stopping procedures)
- e. Safety considerations
- f. Project specific operational procedures
- g. Project specific maintenance procedures
- h. Manufacturer's operating and maintenance instructions – specific to the project
- i. Copy of each wiring diagram
- j. Copy of approved shop drawing(s) and Contractor's coordination/layout drawing(s)
- k. List of spare parts and recommended quantities
- l. Product Data: Mark each sheet to clearly identify specific products and component parts and data applicable to installation. Delete inapplicable information.
- m. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams
- n. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified.
- o. Warranties and Bonds, as specified in the General Conditions

3. Transmittals

- a. Prepare separate transmittal sheets for each manual. Each transmittal sheet shall include at least the following: the Contractor's name and address, Owner's name, project name, project number, submittal number, description of submittal and number of copies submitted.
- b. Submittals shall be transmitted or delivered directly to the office of the Engineer, as indicated in the Contact Documents or otherwise directed by the Engineer.
- c. Provide copies of transmittals (only, i.e., without copies of the respective submittal) directly to the Resident Project Representative.

- C. Manuals for Equipment and Systems - In addition to the requirements listed above, for each System, provide the following:
1. Overview of system and description of unit or system and component parts. Identify function, normal operating characteristics and limiting conditions. Include performance curves, with engineering data and tests and complete nomenclature and commercial number of replaceable parts.
 2. Panelboard circuit directories including electrical service characteristics, controls and communications and color coded wiring diagrams as installed.
 3. Operating procedures: include start-up, break-in and routine normal operating instructions and sequences; regulation, control, stopping, shut-down and emergency instructions; and summer, winter and any special operating instructions.
 4. Maintenance Requirements
 - a. Procedures and guides for trouble-shooting; disassembly, repair, and reassembly instructions
 - b. Alignment, adjusting, balancing and checking instructions
 - c. Servicing and lubrication schedule and list of recommended lubricants
 - d. Manufacturer's printed operation and maintenance instructions
 - e. Sequence of operation by instrumentation and controls manufacturer
 - f. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance
 5. Control diagrams by controls manufacturer as installed (as-built)
 6. Contractor's coordination drawings, with color coded piping diagrams, as installed (as-built)
 7. Charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams. Include equipment and instrument tag numbers on diagrams.
 8. List of original manufacturer's spare parts and recommended quantities to be maintained in storage
 9. Test and balancing reports, as required
 10. Additional Requirements as specified in individual product specification
 11. Design data for systems engineered by the Contractor or its Suppliers
- D. Electronic Transmission of O&M Manuals
1. Unless otherwise approved by the Engineer, O&M manuals may not be transmitted by electronic means other than by CD-ROM. Electronic O&M manuals shall meet the following conditions:
 - a. The above-specified transmittal form is included.

- b. All other requirements specified above have been met, including, but not limited to, coordination by the Contractor, review and approval by the Contactor.
 - c. The submittal contains no pages or sheets large than 11 x 17 inches.
 - d. With the exception of the transmittal sheet, the entire submittal is included in a single file.
 - e. Files are Portable Document Format (PDF) – with the printing function enabled.
2. When electronic copies are provided, transmit three hard-copy (paper) originals to the Engineer with an electronic copy on CD-ROM.
 3. The electronic copy of the O&M manual must be identical in organization, format and content to the hard copies of the manual.

1.03 SERVICES OF MANUFACTURERS' REPRESENTATIVE

- A. The manufacturer's representative shall certify that all manufactured products incorporated in this project are manufactured in the United States and comply with the Buy American requirements of this project by completing the Manufacturer's Buy American Certificate Compliance Statement (Section 01000, Attachment A).
- B. The manufacturer's representative shall certify on the enclosed certification form that the equipment installed for the subject project has been installed in a satisfactory manner, has been satisfactorily tested, and is ready for operation

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SUBMITTAL SCHEDULE

- A. Operation and maintenance manuals shall be delivered directly to the office of the Engineer, as follows:
 1. Provide preliminary copies (two hard copies and one electronic on CD-ROM) of each manual to the office of the Engineer, no later than 30 days following approval of the respective shop drawings.
 2. Provide final copies (three hard copies and one electronic) of each completed manual prior to testing. The electronic copy shall be presented in Adobe PDF format.
 3. Provide a letter that grants the Engineer and Owner to the limited right to use and reproduce each manual (in it its entirety or any portion thereof) from the respective equipment manufacturer(s). Such limited right shall allow the Engineer and Owner to use each manual or and portion thereof for:
 - a. the assembly of a comprehensive facility operation and maintenance manual for the sole benefit of the Owner; and,
 - b. supplemental training of the Owner's personnel and operators, over and above the required vendor's training, regarding operation of the facility as a system.

- B. The ENGINEER will review Operation and Maintenance manuals submittals for operating equipment for conformance with the requirements of the applicable specification Section. The review will generally be based on the *O&M Manual Review Checklist* appended to this Section.
- C. If during test and start-up of equipment, any changes were made to the equipment, provide two hard copies of as-built drawings or any other amendments for insertion in the previously transmitted final manuals. In addition, provide one revised electronic version including the as-built drawings and any other amendments. The manuals shall be completed, including updates, if any, within 30 days of start-up and testing of the facility.

3.02 TRAINING/INSTRUCTIONS TO OWNER'S PERSONNEL

- A. Before final initiation of operation, Contractor or Contractor's vendors shall train/instruct Owner's designated personnel in the operation, adjustment, and maintenance of products, equipment and systems at times convenient to the Owner. Such training/instruction shall be scheduled and held at times to accommodate the work schedules of Owner's personnel, including splitting the required training/instruction time into separate sessions and/or presented at reasonable times other than the Contractor's "normal working hours" or the Owner's normal day shift.
- B. Use operation and maintenance manuals as basis for instruction. Train/instruct the Owner's personnel, in detail, based on the contents of manual explaining all aspects of operation and maintenance of the equipment. If the respective equipment is inter-related to the operation of other equipment, all interlock, constraints, and permissive shall be explained.
- C. Prepare and insert additional data in each Operation and Maintenance Manual when the need for such data becomes apparent during training/instruction.
- D. Vendor's training/instruction will be considered acceptable based on the completed *Owner's Acknowledgement of Manufacturer's Instruction* as indicated on the Equipment Manufacturer's Certification of Installation, Testing, and Instruction appended to this Section.

END OF SECTION

**EQUIPMENT MANUFACTURER'S CERTIFICATE OF INSTALLATION, TESTING
AND INSTRUCTION**

Owner: _____

Project: _____

Contract No. _____

Project No. _____

EQUIPMENT SPECIFICATION SECTION _____

EQUIPMENT DESCRIPTION _____
(Print equipment name and model with serial No.)

I _____, Authorized representative of
(Print Name)

(Print Manufacturer's Name)

hereby CERTIFY that the above listed equipment installed for the subject project has been installed in a satisfactory manner, has been satisfactorily tested, and is ready for operation.

CERTIFIED BY: _____ DATE: _____
(Signature of Manufacturer's Representative)

OWNER'S ACKNOWLEDGMENT OF INSTRUCTION

[I] [We] the undersigned, authorized representatives of Cobb County have received the required instruction on the operation, lubrication, and maintenance of the subject equipment and are prepared to assume normal operational responsibility for the equipment:

_____ DATE: _____

_____ DATE: _____

_____ DATE: _____

O&M Manual Review Checklist, continued

Page 2

O&M Manual Review Checklist

Submittal No.: _____

Project No.: _____

Manufacturer: _____

Equipment Submitted: _____

Specification Section: _____

Date of Submittal: _____

General Data

- _____ 1. Are the area representative's name, address, e-mail address and telephone number included?
- _____ 2. Is the nameplate data for each component included?
- _____ 3. Are all associated components related to the specific equipment included?
- _____ 4. Is non-pertinent data crossed out or deleted?
- _____ 5. Are drawings neatly folded and/or inserted into packets?

Operations and Maintenance Data

- _____ 6. Is an overview description of the equipment and/or process included?
- _____ 7. Does the description include the practical theory of operation?
- _____ 8. Does each equipment component include specific details (design characteristics, operating parameters, control descriptions, and selector switch positions and functions)?
- _____ 9. Are alarm and shutdown conditions clearly identified? Does it describe possible causes and recommended remedies?
- _____ 10. Are step procedures for starting, stopping, and troubleshooting the equipment included?
- _____ 11. Is a list of operational parameters to monitor and record for specific equipment included?
- _____ 12. Is a proposed operating log sheet included?
- _____ 13. Is a spare parts inventory list included for each component?
- _____ 14. Is a lubrication schedule for each component included - or does it clearly state "No Lubrication Required"?
- _____ 15. Is a maintenance schedule for each component included?
- _____ 16. Is a copy of the warranty information included?

O&M Manual Review Checklist, continued

Page 2

Review Comments

Is the submittal fully approved (yes/no)?

If not, see the following are the points of rejection that must be addressed and require resubmittal by the Contractor:

Item No.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

Reviewed By: _____ Date: _____

Legend

- 1 = OK
- 2 = Not Adequate
- 3 = Not Included

Note: This submittal has been reviewed for compliance with the Contract Documents.

SECTION 01740

WARRANTIES AND BONDS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.

1.02 RELATED WORK

- A. Refer to General Terms and Conditions for the general requirements relating to warranties and bonds.
- B. Specific requirements for warranties for the work and products and installations that are specified to be warranted are included in the individual Sections.

1.03 SUBMITTALS

- A. Submit written warranties to the Owner for review prior to Substantial Completion for each facility. Submit final written warranties to the Owner at Final Completion for each facility.
- B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner for approval prior to final execution.
- C. Refer to individual Sections for specific content requirements, and particular requirements for submittal of special warranties.
- E. At Final Completion for each facility, compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- F. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents and sized to receive 8-1/2-in by 11-in paper.
- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the Section in which specified and the name of the product or work item.
- H. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address and telephone number of the installer, supplier and manufacturer.
- I. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS", the project title or name and the name, address and telephone number of the Contractor.

1.04 WARRANTY REQUIREMENT

- A. Related Damages and Losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.
- B. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the Owner has benefited from use of the work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
- E. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the contract Documents.
- F. The Owner reserves the right to refuse to accept work for the project where a special warranty, certification, or similar commitment is required on such work or part of the work, until evidence is presented that entities required to countersign such commitments are willing to do so.
- G. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the work that incorporates the products, nor does it relieve suppliers, manufacturers and subcontractors required to countersign special warranties with the Contractor.

1.05 MANUFACTURERS CERTIFICATIONS

- A. Where required, the Contractor shall supply evidence, satisfactory to the Engineer, that the Contractor can obtain manufacturers' certifications as to the Contractor's installation of equipment.

1.06 DEFINITIONS

- A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 15410

PLUMBING - PIPING SYSTEMS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Refer to Section 01010, Summary of Work for the areas where work is to be accomplished.
- B. This Section specifies the basic Plumbing Systems of Piping and the materials of each system, including valves. Specific uses and applications are specified in other related Sections.
- C. Furnish all labor, materials, equipment, services and incidentals required and install complete interior Plumbing Piping Systems as specified herein.
 - 1. Gas System
 - 2. To carry out the intent and purpose of the design criteria, all necessary parts to make a complete working system ready for use shall be furnished without extra charge. The Contractor shall be responsible to coordinate the system installation and routing with the work of all trades.
- D. Refer to Section 15500 for additional requirements.

1.02 SUBMITTALS

- A. Submit shop drawings and technical literature covering details of all plumbing-piping systems being furnished under this Section prior to fabrication, assembly or shipment.
- B. For units that will be shipped exposed, provide a description of the protective packaging that will be used during transit
- C. All submittals shall contain a statement that all of the specifications have been read and complied with. The certification statement shall be made by all of the following that are applicable; the Contractor, sub-contractor and the vendor. The statement shall be an individual statement for each party involved, and shall be included with every submittal and resubmittal.
- D. Detailed layout drawings of piping in mechanical rooms and other congested areas shall be provided. Drawings shall show the locations of piping appurtenances, specialties, and all valve banks.
- E. Provide manufacturers catalogs, literature, and engineering data on all hangers and supports. Load ratings, materials, and installation shall be in accordance with the recommendations of MSS SP-58 and MSS SP-69.

1.03 REFERENCE STANDARDS

- A. Refer to Section 01010, Summary of Work.

1.04 QUALITY ASSURANCE

- A. Inspection by the Engineer's representative or failure to inspect shall not relieve the Contractor of responsibility to provide materials and perform the work in accordance with the documents.
- B. The piping manufacturer shall furnish an affidavit of compliance certifying that all materials used and work performed shall comply with the specified requirements. The Contractor shall provide copies of mill test confirming the type of material used in the various components.

1.05 DELIVERY, STORAGE AND HANDLING

- A. The Contractor shall comply with the delivery storage and handling requirements of this section and Section 01600.
- B. All materials shall be inspected for size, quality and quantity against approved shop drawings upon delivery.
- C. Delivery schedule of all equipment shall be coordinated with the Contractor. Equipment ready for shipment prior to the agreed on shipping date shall be stored without cost to the Owner by the manufacturer.
- D. All materials shall be suitably packed for shipment and long term storage. Each package shall be labeled to indicate the project and the contents of each package. Where applicable, equipment numbers shall be marked on the container.
- E. All equipment shipped that is exposed such as on a flat bed truck shall be protected during transit. The equipment shall be protected from moisture, road salt, dirt and stones or other materials thrown up from other vehicles. Electrical components shall be protected as above, but with special attention to moisture. The method of shipment protection shall be defined in the submittals.
- F. All materials shall be stored in a covered dry location off of the ground. When required to protect the materials they shall be stored in a temperature-controlled location.

1.06 COORDINATION

- A. The Drawings shall indicate the extent and general arrangement of the systems. If any departures from the specifications are deemed necessary, details of such departures and the reasons therefore shall be submitted as soon as practical for review. No such departures shall be made without the prior written concurrence of the Engineer.
- B. The Contractor shall retain a structural engineer licensed in the State of Georgia to identify the location and placement of all concrete inserts and welding attachments..
- C. The Contractor shall assume full responsibility for coordination of the Plumbing systems, including; scheduling, and verification that all structures, piping and the mounting of equipment are compatible.

PART 2 PRODUCTS

2.01 PIPING SYSTEM MATERIALS

- A. Natural Gas Systems

1. Low pressure (less than 14-in water column) piping 2-in and smaller shall be Schedule 40, black steel with malleable iron fittings.
2. High pressure (greater than 14-in water column) piping shall be Schedule 40, black steel with welded fittings.
3. Piping larger than 2-in diameter shall be schedule 40 black steel pipe and fittings with welded joints.
4. Gas train vent piping shall be of the same material as that specified for low pressure piping systems.

2.02 VALVES

A. Gas Valves

1. Gas valves 2-in and smaller shall be three-piece bronze ball valve with threaded ends equal to Hammond 8604; Watts 6800 (YRPV) or Apollo 82-100, modified with tee handles.
2. Gas valves larger than 2-in shall be lubricated plug valves equal to valves manufactured by Powell; Homestead and Rockwell.
3. Gas valves shall be listed suitable for natural gas service.

2.03 SLEEVES AND CASTINGS

A. Sleeves

1. Sleeve all piping through walls, beams and partitions. All wall sleeves shall finish flush with the finish line.
2. Sleeve all piping passing through floor slabs. All sleeves shall extend 2-in above the finish floor slab.
3. Pipe sleeves shall be Schedule 40 galvanized steel pipe conforming to ASTM A53. Provide a 2-in minimum circumferential water stop welded to exterior of sleeve at its midpoint. Ends of sleeves shall be cut and ground smooth and shall be flush with the wall or ceiling and extend 2-in above finished floors. Sleeves to be sealed with mechanical seals shall be sized in accordance with the seal manufacturer's recommendations. Sleeves to be sealed by caulking and sleeves for insulated piping shall be sized as required.

B. Castings

1. Provide waterproof castings on each plumbing pipe penetrating walls of wet wells, tanks or pits. Castings shall be of size and length to suit pipe and wall thickness.
2. Wall castings shall be ductile iron conforming to ANSI/AWWA A21.51/C151, thickness Class 53, diameter as required. Flanges and/or mechanical joint bells shall be drilled and tapped for studs where flush with the wall. Castings shall be provided with a 2-in minimum circumferential flange/waterstop integrally cast with or welded to the casting, located as follows: for castings set flush with walls located at the center of the overall length of the casting; for castings which extend through wall located within the middle third of the wall.

C. Seals

1. Mechanical seals shall be modular, adjustable, bolted, mechanical type consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and sleeve. The seal shall be rated by the manufacturer for 40-ft of head or 20 psig. Mechanical seals shall be Link-Seal by Thunderline Corp., Wayne, MI or equal.
2. Sealant shall be a two part foamed silicone elastomer by Dow Corning Co., Product No. 3-6548 silicone R.T.V.; 3M brand fire barrier products caulk C.P. 25 and 3M brand putty 303; or Flame-Safe fire stop systems Fig. No. FS-500 by Thomas & Betts Corp. Sealant bead configuration, depth and width shall be in accordance with manufacturer's recommendations.

2.04 HANGERS, SUPPORTS AND ANCHORS

- A. Piping support systems shall include restraints as required by the applicable building codes to withstand seismic loading. Design shall be provided by a Georgia licensed professional engineer hired by the Contractor as specified in other Sections.
- B. The contractor shall be responsible to provide a complete system of supports, expansion joints, and anchors. Additional supports may be required adjacent to expansion joints, couplings, and valves.
- C. Hangers supporting horizontal piping at ceilings shall be of the clevis type and spaced 5-ft apart for soil, waste, drain, rainwater leaders and vent pipes; 8-ft apart for supply and service pipe 1-1/2-in diameter and larger; and 6-ft apart for pipe smaller than 1-1/2-in diameter.
- D. All hangers shall be of a type to permit vertical adjustment after installation.
- E. Materials and installation shall be furnished under this Section. All hangers and supports for copper piping shall be PVC coated where in contact with copper.
- F. All piping hangers, supports, and anchors shall be galvanized or Type 304 stainless.

2.05 PIPE MARKING AND COLOR CODING

- A. Pipe marking shall be part of the work of this Section to assist as required by the Engineer to identify the pipe contents, direction of flow and all pertinent data required for proper marking of pipe.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install all piping, valves, hangers and appurtenances as specified herein and in the referenced Sections above.
- B. The Contractor shall not install any equipment or materials until the Owner and Engineer have approved all submittals. If any equipment or materials are installed prior to approval of the submittals, it shall be at the Contractor's risk.

- C. In general, corrections or comments or lack thereof, made relative to submittals during review shall not relieve the Contractor from compliance with the requirements of the drawings and specifications. Submittals are for review of general conformance with the design concepts of the project and general compliance with the contract documents. The Contractor is responsible for the final design conforming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating the work of all trades, and performing the work in a safe and satisfactory manner.
- D. Valves
1. Install control valves to all locations grouped and located to be easily operated, through access panels, doors, or adjacent to equipment.
- E. Flanged Connections
1. All flange faces shall be in perfect alignment with the holes straddling the vertical center line of the piping.
 2. All bolts shall be well lubricated over the entire thread length with a heavy graphite and oil mixture prior to the tightening operation. Bolts shall be tightened with proper wrenches, care being taken to secure uniform pressure on the bolts and gasket and to avoid overstressing of the bolts, dishing of the flanges and compression of the gasket beyond its proper limits.
 - a. Commercial grade carbon steel bolts, ASTM A307, Grade B shall be tightened to obtain approximately 15,000 psi stress based on the root area of the thread. Alloy steel bolts, ASTM A193, Grade B7 shall be tightened to obtain a stress of 45,000 psi.
 3. All bolts shall be of sufficient length so that when fully tightened, a minimum of two full threads shall extend beyond the nut.
- F. Screwed Connections
1. All screwed connections shall have full thread of true taper, accurate to gauge and conform to ANSI.
 2. Reduction in size shall be made using reducing fittings.
 3. The use of bushings or close nipples is prohibited. Nipples shorter than 4-in in length shall be Schedule 80.
 4. Plugs shall be steel or brass with square head.
 5. Screwed joints shall be made with an approved joint compound applied to the male thread only. Caulking of screwed joints will not be allowed.

3.02 FIELD TESTING

- A. Provide all air and water necessary for testing the piping systems as specified under this Section of the work. Provide all connections for testing under this Section. Remove all debris resulting from testing. Use the water in an efficient and economical manner.
- B. Provide all apparatus and all other supplies or materials which may be necessary for testing the systems and operating the apparatus during the period while tests of any kind are being made, or for carrying out the work of the Contract.
- C. The various piping systems shall be subjected to water, smoke, or air tests as noted and shall hold tight at pressures stated without extra pumping or water addition for the time intervals stated.
- D. All additional tests, methods or materials that may be required by the local ordinances and not specifically specified herein, shall be made as directed by the Engineer or the local inspection authority.
- E. Provide for all repeated tests as necessary to make systems tight as required.
- F. Test water piping as follows:
 - 1. Test all interior potable hot, cold and protected water piping to a water pressure of 150 psi to the lowest level and maintain this pressure without additional pumping for 2 hours.
- G. Test gas piping as follows:
 - 1. Test all gas piping with air under pressure as required and recommend by the NFPA Pamphlet Nos. 54 and 58 Regulations which shall be considered as part of this Section.

3.03 CLEANING

- A. At the completion of the work, clean all piping, fixtures, equipment, apparatus and exposed trim for same included in this Section and, where required, polish ready for use.
- B. Thoroughly disinfect the entire potable water distribution systems with a solution of not less than 50 ppm of available chlorine. Allow the disinfecting solution to remain in the system for a period of 3 hours after which time, open all valves and faucets and flush the system with clean water until the residual chlorine content is not greater than 0.2 ppm, unless otherwise directed.

END OF SECTION

SECTION 15500

HVAC

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. These Sections cover the requirements of the HVAC Work to be performed and shall not void any of the requirements specified under the General Conditions or General Requirements.
- B. The equipment for which work is to be accomplished are indicated in Section 01010, Summary of Work and the following specifications:
1. Specification Sections

15500	HVAC
15410	Plumbing – Piping Systems
15250	Thermal Insulation
15503	HVAC Demolition
15505	HVAC Piping
15990	Testing, Adjusting and Balancing
- C. The requirements specified herein shall be modified only if specified otherwise for particular application in other Divisions.
- D. Work included under the "Scope of Work" of this HVAC Section includes all labor, material, equipment, tools and services necessary to furnish, deliver, unload, install, test and place in satisfactory operation, the equipment, services and systems as called for under the HVAC Section(s) including any incidental work not shown, or not specified but which can reasonably be inferred as belonging to the various systems and necessary in good practice to provide complete and fully operational systems. Cutting and patching is included in this Section and shall be done as described otherwise indicated.
- E. Equipment shall consist of the following:
1. indoor mounted air handling units with filters
 2. self contained air handling units with filters
 3. self contained condenser air handling units and filters
 4. split system units, condensing units, air handling units, and filters
 5. split system units, heat pumps, air handling units, and filters
 6. packaged rooftop air conditioning units with gas heat
- F. The following work descriptions are not intended to in any way limit the above broad statement, but are intended as a more specific mention of the most important items included therein.

1. For all Areas:

- a. All work done regarding refrigerant removal and replacement shall be in accordance with all Federal, State and Local laws and regulations and the Owner’s Waste Stream Management Plan. This includes, but is not limited to, evacuation, purging, and testing. All refrigerant shall be captured, and no refrigerant shall be released to the atmosphere. Contractor shall provide all necessary refrigerant as required to recharge the systems at the completion of the relocation, and after the equipment is returned to its original location.

G. The design conditions for the equipment are as follows:

Outdoor Design Conditions

Summer:	94°F Dry-bulb, 74°F Wet-bulb
Winter	21°F Dry-bulb, 16 mph wind velocity
Approximate Heating Degree Days	3273
Approximate Cooling Degree Days	1611
Site Elevation	1070 ft. Above Sea Level

For air-cooled condensing unit selection, the summer design dry bulb temperature plus 10 degrees F shall be used.

Indoor Design Conditions

	Summer	Winter
	Space	Space
	Temp. °F	Temp. °F
ALL Occupied Spaces	75°F, 50% RH	72°F
Unoccupied Spaces	80°F, 50% RH	60°F

Contractor shall ensure design conditions conform to latest Georgia Energy Code requirements and shall consult with Owner should the condition specified in this Section no comply with current Georgia Energy Code.

- H. Provide equipment of the type, size, capacity and arrangement as indicated in Section 01010, Summary of Work.
- I. All ductwork, piping, and equipment of the actual equipment furnished shall be coordinated by the Contractor. Contractor shall size ductwork and piping, every offset or fitting, every hanger or support, or structural difficulty that may be encountered. A complete working system ready for use shall be furnished. The Contractor shall be responsible to coordinate the system installation and routing with the work of all trades.
- J. Furnish and install all HVAC Systems as described in the Section 01010, Summary of Work.

1.02 SUBMITTALS

- A. Submit shop drawings and product data for the following:
 - 1. Catalog cuts and data sheets for all equipment.

2. Design calculations for record purposes, signed and sealed by a professional engineer hired by the Contractor as specified in Section 01010, Summary of Work. Engineering services shall be provided as required in Part 2.
3. Automatic control drawings with composite wiring diagrams, including bills of material and descriptions of operation for all systems. Panel layouts and name plate lists for all local and central panels. Data sheets for all control system components.
4. Software licensing and user agreements shall be submitted for approval with the shop drawings for the equipment using the software. The submittal shall be a copy of the final agreement document that is to be signed.
5. Complete valve and damper schedules for damper submittals including the following for each type or model of damper to be furnished for the project: materials of construction for blades, frames, bearings, linkages and seals; flow and leakage characteristics; typical operating torque requirements or characteristics; options to be furnished; general installation and maintenance instructions. Damper schedules shall include damper type; unit served; damper service; damper size; duct size; drive linkage location; installation arrangement (flanged or in duct) and damper operator type.
6. For all air handling units, submit the following:
 - a. Unit data sheets; to include catalog data, a description of the proposed unit, size, type, arrangement, and materials of construction.
 - b. For belt drive equipment, provide drive data indicating sheave sizes, belt size, number and length.
 - c. Each submittal shall include pertinent equipment dimensional data, heating and cooling coil operating data. Submittal data and the unit schedules. The submittal shall include fan data sheets with a description of the proposed fan, fan size, type, arrangement, materials of construction, weight, motor horsepower, motor type, power supply, and frame size. Provide catalog data and selections for vibration isolators, include materials of construction. For belt drive equipment; provide drive data indicating the sheave sizes, belts size, number and length. Each submittal shall include pertinent equipment dimensional data, fan performance (operating data information, and a performance curve showing the fan operating point and range. Minimum curve size shall be 8-in by 6-in. Faxed copies of curves are not acceptable. A list of accessories to be furnished shall be included on each submittal. Copies of operating and maintenance manuals shall be submitted. Significant dimensional differences between the specified equipment and the proposed equipment shall be noted on the equipment submittal. The Contractor shall provide data to show the dimensionally different equipment will fit within the space and still provide suitable clearance. Where corrosion resistance is required, provide conformation of material suitability for the specified service.
 - d. For heating sections, provide information on type of heating, air entering and leaving conditions, air pressure drop, heating media entering and leaving conditions and flow or consumption, and pressure drop. Provide size, type, arrangement, materials of construction, and operating weight.
 - e. For cooling sections, provide information on type of cooling, air entering and leaving conditions, air pressure drop, cooling media entering and leaving conditions, flow, and

pressure drop. Provide size, type, arrangement, materials of construction, and operating weight.

- f. For condensing sections provide information on number and type of compressors, type of refrigerant and refrigerant charge, and controls provided and operating weight. Provide electrical data for power and controls. For condensing coils, provide air entering and leaving conditions, air pressure drop, size, type, arrangement, and materials of construction.
 - g. List of accessories to be furnished shall be included on each submittal.
 - h. Provide a recommended list of spare parts to be provided.
7. Detailed equipment, ductwork and piping layout drawings; minimum scale 1/4-in = 1-ft-0-in for interior systems and equipment, dimension clear service spaces for motors and drives, filter, coils and spacer section access doors, and ductwork access panels and doors. (Site layout drawings and roof plans showing HVAC equipment and systems may be prepared and submitted at scales smaller than 1/4-in = 1-ft-0-in, subject to Engineer's prior approval.)
 8. Piping and appurtenances, materials and joining methods. Pipe hanger materials and methods.
 9. Ductwork materials, joining methods, reinforcing and material gauges. Where options are allowed by SMACNA, the proposed option shall be clearly defined. Indicate proposed materials and methods for ductwork and equipment hangers.
 10. Prepare dimensional comparisons between proposed equipment and scheduled equipment when the proposed equipment is dimensionally larger than that scheduled. Do not propose dimensionally larger equipment from an alternate manufacturer for installation in confined areas, or when the installation of alternate equipment will result in reduction of service access below that recommended by the manufacturer.
 11. Prepare layouts showing size, arrangement, and routing of field fabricated refrigerant piping for split-systems and air handling units with remote condensers. Include a letter from the AC system manufacturer indicating their approval of the proposed sizing and routing.
 12. For units that will be shipped exposed, provide a description of the protective packaging that will be used during transit.
 13. When special hangers, supports, anchors, or hold downs are required that are not covered by standards provide signed and sealed calculations and details for record purposes.
 14. All submittals shall contain a statement that all specification Sections have been read and complied with. The certification statement shall be made by all of the following that are applicable; the Contractor, sub-contractor and the vendor. The statement shall be an individual statement for each party involved, and shall be included with every submittal and resubmittal.
 15. Submit air system testing, adjusting and balancing reports for review and approval.
 16. Operation and Maintenance Data

- a. Submit to the Engineer as provided in Section 01730, Operating and Maintenance Manuals. The following information shall be considered a minimum. Where applicable, provide information required for specific pieces of equipment.
 - 1) Personnel familiar with the operation and maintenance of the specific information shall prepare manuals.
 - 2) Equipment shall be identified with Owner's existing equipment numbers. Where existing identification numbers are not evident, consult with Owner for numbering system
 - 3) Provide information in three ring binders. All sheets shall have reinforced punches. Tabbed dividers shall separate all sections. Drawings will be bound in the manual, or contained in envelopes bound into the manual.
 - b. Contents - Each volume shall contain the following minimum contents:
 - 1) Installation including instructions for unpacking, installing, aligning, checking and testing. Foundation data, allowable piping loads, and electrical design shall be included.
 - 2) Operating Instructions to provide pre-operational checks, start up and shut down, and description of all control modes. Include emergency procedures for all fault conditions and actions to be taken for all alarms. Procedures for long term storage shall be included.
 - 3) Maintenance shall include preventive, and corrective. Schedules for test of other functions are to be included. Provide a list of tools required to service the equipment. Trouble shooting instructions to include a trouble-shooting guide shall be included.
 - c. Spare Parts List
 - d. Shop Drawing Data to include performance curves, data sheets, flow diagrams, wiring diagrams, and descriptive drawings.
17. Submit the following for each insulation by System: manufacturer's product data showing conformance with this Section for all required insulation, jackets, covers, coatings, adhesives, fasteners, supports and appurtenances; complete manufacturer's instructions for installation of all required items.
 18. All materials deliveries must have accompanying manufacturer's certifications attesting to satisfactory results of product testing showing conformance with this Section.
 19. Provide a recommended list of spare parts to be provided
 20. In general, corrections or comments or lack there of, made relative to submittals during review shall not relieve the Contractor from compliance with the requirements of the drawings and specifications. Submittals are for review of general conformance with the design concepts of the project and general compliance with the contract documents. The Contractor is responsible for the final design conforming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating the work of all trades, and performing the work in a safe and satisfactory manner.

1.03 REFERENCE STANDARDS

- A. These standards shall be considered as minimum requirements. This is a general list and not all standards listed are necessarily referenced elsewhere in this Section. Specific requirements of this Section shall have precedence. In case of conflict between published requirements, the Engineer shall determine which is to be followed.

- B. Abbreviation and the title of Federal, State and industry standards, technical societies, associations and institutes and other organizations which may be used are as follows:
 - 1. Associated Air Balance Council (AABC)
 - 2. American Conference of Governmental Industrial Hygienists (ACGIH)
 - 3. Air Diffusion Council (ADC)
 - 4. American Bearing Manufacturers Association (ABMA)
 - 5. Air Movement and Control Association (AMCA)
 - 6. American National Standards Institute (ANSI)
 - 7. Air Conditioning and Refrigeration Institute (ARI)
 - 8. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)
 - 9. American Society of Mechanical Engineers (ASME)
 - 10. American Society for Testing and Materials (ASTM)
 - 11. Factory Mutual (FM)
 - 12. Institute of Electrical and Electronic Engineers (IEEE)
 - 13. National Institute of Standards and Technology (NIST)
 - 14. National Environmental Balancing Bureau (NEBB)
 - 15. National Electrical Code (NEC)
 - 16. National Electrical Manufacturers Association (NEMA)
 - 17. National Fire Protection Association (NFPA)
 - 18. Occupational Safety and Health Administration (OSHA)
 - 19. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
 - 20. Underwriters Laboratories (UL)

- C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 QUALITY ASSURANCE

- A. Contractor shall comply with the following criteria, or more stringent requirements if required in the Owner's Bid or Proposal securing this work.
 - 1. Has been regularly engaged in the installation of Mechanical (HVAC) systems.
 - 2. Has performed work of similar or greater complexity on at least three (3) projects within the last five (5) years. Submit documentation demonstrating required experience.
 - 3. Submit a minimum of two references for projects of similar or greater complexity.
 - 4. Submit resumes of key personnel to be utilized on this project.
- B. Provide single source supplier/installer responsibility for the following systems or services:
 - 1. ATC Equipment
 - 2. Thermal Insulation
 - 3. Testing and Balancing
- C. Provide single source supplier/installer responsibility for systems where specified in other related Sections.
- D. The insulation materials to be furnished under this section shall be essentially the standard products of manufactures regularly engaged in the manufacture of insulation systems.
- E. Several manufacturers are indicated as acceptable for each type of insulation in these specifications. The insulation sub-contractor shall be responsible for determining that all insulation supplied for the project is suitable for installation in the spaces indicated. The insulation sub-contractor shall also insure that all materials used are compatible and in compliance with applicable codes and standards.
- F. All equipment of a given type included in this section shall be furnished by or through a single manufacturer or as specified on the schedules
- G. Inspection by the Engineer's representative or failure to inspect shall not relieve the Contractor of responsibility to provide materials and perform the work in accordance with the documents.
- H. The Owner and Engineer reserve the right to sample and test any materials after delivery and to reject all components represented by a sample that fails to comply with the specified requirements.
- I. An authorized representative of the manufacturer shall certify the initial startup of the equipment per Section 07130 Paragraph 1.03. The Owner and Engineer shall witness startup.
- J. All rotating parts of equipment shall be statically and dynamically balanced at the factory.

1.05 SYSTEM DESCRIPTION

- A. Equipment for replacement shall be as described in the Section 01010, Summary of Work.

1.06 DELIVERY, STORAGE AND HANDLING

- A. The Contractor shall comply with the delivery storage and handling requirements of this section and Section 01600.
- B. All materials shall be inspected for size, quality and quantity against approved shop drawings upon delivery.
- C. Delivery schedule of all equipment shall be coordinated with the Contractor. Equipment ready for shipment prior to the agreed on shipping date shall be stored without cost to the Owner by the manufacturer.
- D. All materials shall be suitably packed for shipment and long term storage. Each package shall be labeled to indicate the project and the contents of each package. Where applicable, equipment numbers shall be marked on the container.
- E. All equipment shipped that is exposed such as on a flat bed truck shall be protected during transit. The equipment shall be protected from moisture, road salt, dirt and stones or other materials thrown up from other vehicles. Electrical components shall be protected as above, but with special attention to moisture. The method of shipment protection shall be defined in the submittals.
- F. Instruction for the servicing and startup of equipment in long term or prolonged storage shall accompany each item.
- G. All materials shall be stored in a covered dry location off of the ground. When required to protect the materials they shall be stored in a temperature-controlled location.

1.07 COORDINATION

- A. The Contractor shall retain a Georgia licensed structural engineer to establish the location and placement of all concrete inserts and welding attachments and coordinate those locations with the Owner.
- B. The Contractor shall assume full responsibility for coordination of the HVAC systems, including; scheduling, and verification that all structures, ducts, piping and the mounting of equipment are compatible.
- C. The Contractor shall not install any equipment or materials until the Owner and Engineer have approved all submittals. If any equipment or materials are installed prior to approval of the submittals, it shall be at the Contractor's risk.

1.08 ENGINEERING SERVICES

- A. When engineering services are specified to be provided by the Contractor, the Contractor shall retain a licensed professional engineer to perform the services. The engineer shall be licensed at the time the work is done and in the State in which the project is located. If the State issues discipline specific licenses, the engineer shall be licensed in the applicable discipline. In addition, the engineer shall be experienced in the type of work being provided.
- B. All work is to be done according to the applicable regulations for professional engineers, to include signing, sealing and dating documents. When submittals are required by a professional

engineer, in addition to state required signing and sealing, a copy of the current wallet card or wall certificate indicating the date of expiration shall be included with the submittal.

1.09 UL LISTING

- A. All materials, equipment and system components of the HVAC system must be UL Listed. If factory UL listing of all system components is not available, the manufacturer must include in their scope of supply, ALL expenses associated with getting the complete installation UL field labeled, by a UL representative. This includes all hourly or per diem costs and expenses of the UL representative, all costs to bring the system or specific components, within UL field labeling compliance, and all costs of the manufacturer's representative.

1.10 MAINTENANCE

- A. Maintain and service all equipment and systems until the particular equipment or the system has been accepted by the Owner.
- B. Maintenance shall include compliance with the manufacturers operating and maintenance instructions as well as periodic cleaning or replacement of air handling system filters.
- C. Compile records of all maintenance and lubrication work performed on Owner or Contractor furnished equipment. Maintain records at the construction or installation site and make available at all times for review by the Owner or Engineer. At the request of the Owner or Engineer submit copies of these records to the Owner for information and/or review.
- D. Provide all special tools required for normal maintenance. Tools shall be packaged in a steel case, clearly and indelibly marked on the exterior to indicate equipment for which tools are intended.
- E. Provide to the Owner a list of all spare and replacement parts with individual prices and location where they are available. Prices shall remain in effect for a period of not less than 1 year after start-up and final acceptance.

1.11 DEFINITIONS

- A. Particular terminology used under this Section is defined as follows:
 - 1. Traffic Level and Personnel Level - Areas, including process areas, equipment rooms, boiler rooms and other areas where insulation may be damaged by normal activity and local personnel traffic. Area extends to 8-ft above floor, walkways, platforms and stairs, and horizontally 3-ft beyond the edge of walkways, platforms, and stairs.
 - 2. Exposed Piping and Ductwork - Piping and ductwork visible from the floor level and includes all piping and ductwork in equipment rooms, boiler rooms, etc.
 - 3. Concealed Piping and Ductwork - Piping and ductwork not visible from the floor level and includes piping and ductwork above hung ceilings and in shaftways.
 - 4. Supply Air Ductwork - Ductwork carrying air from a fan or air handling unit to the space or spaces to which it will be introduced. This air may have been heated or cooled or in the case of ventilation system the air would be neither heated nor cooled. Supply air ductwork extends from the fan or air handling unit to the registers, grills or diffusers at the end of the ductwork.

5. Return Air Ductwork - Ductwork carrying air from the space it was supplied to back to a fan or air handling unit. Return air ductwork extends from the registers or grills at the end of the ductwork to the air handling unit or connection with an outdoor air intake duct.
6. Exhaust Air Ductwork - Ductwork carrying air from a space to a fan and then to be discharged to the outdoors. Exhaust air ductwork extends from the registers or grills at the end of the ductwork to the fan. From the fan exhaust ductwork extends to the discharge point, exhaust air damper, or exhaust air plenum, whichever comes first.
7. Relief Air Ductwork - Ductwork carrying air from a space without a fan to be discharged to the outdoors. Relief air ductwork extends from the registers or grills at the end of the ductwork, to the discharge point, relief air damper, or relief air plenum, whichever comes first.
8. Outdoor Air Ductwork - Ductwork carrying untreated air from the outside to a fan or air handling unit. Outdoor air ductwork starts at the intake point, outdoor air damper, or outdoor air plenum, whichever comes last. The outdoor air ductwork extends to the fan, air handling unit, or connection with a return air duct, whichever comes first.
9. Mixed Air Ductwork - Ductwork that can carry either return air or outdoor air or a combination of both. Mixed air ductwork starts at the connection of the return air and outdoor air ducts and extends to the fan or air handling unit.
10. Outdoor Air Plenum - A plenum that extends from the opening in the skin of the structure to the outdoor air duct. If the outdoor air damper is directly at the intake or there is no outdoor air damper, the plenum will extend to the first size reduction. If the outdoor air damper is not at the intake, the plenum will extend to the outdoor air damper.
11. Exhaust Air Plenum - A plenum that extends from the opening in the skin of the structure to the exhaust air duct. If the exhaust air damper is directly at the discharge or there is no exhaust air damper, the plenum will extend from the last size reduction. If the exhaust air damper is not at the discharge, the plenum will extend to the exhaust air damper.
12. Relief Air Plenum - A plenum that extends from the opening in the skin of the structure to the relief air duct. If the relief air damper is directly at the discharge or there is no relief air damper, the plenum will extend from the last size reduction. If the relief air damper is not at the discharge, the plenum will extend to the relief air damper.
13. Ventilated Spaces - Areas supplied with outdoor air on a continuous or intermittent basis. The outdoor air may be heated and/or cooled or untreated.
14. Heated Spaces - Areas where heat is supplied to maintain a minimum temperature during the heating season.
15. Unheated Spaces - Areas where heat is not applied and there is no minimum temperature during the heating season.
16. Conditioned Spaces - Areas that are provided with heating and mechanical cooling.
17. Non-Conditioned Spaces - Areas that are not provided with mechanical cooling.
18. Indoor Piping - Piping within a building that is not exposed to the weather.

19. Outdoor Piping - Piping that is not within a building and which is exposed to the weather.
20. Indoor Ductwork - Ductwork within a building that is not exposed to the weather.
21. Outdoor Ductwork - Ductwork that is not within a building and is exposed to the weather.
22. Hot Ductwork - Ductwork carrying air with a temperature above the surrounding space temperature.
23. Cold Ductwork - Ductwork carrying air with a temperature below the surrounding space temperature.
24. Hot/Cold Ductwork - Ductwork carrying air with a temperature that can be either above or below the surrounding space temperature.
25. Thermal Conductivity - The rate of heat flow through unit area of a homogeneous substance under the influence of unit temperature gradient in the direction perpendicular to the area. Units-BTU per (hour)(sq ft)(degrees F temp. difference)(per inch thickness).
26. Flues/Stacks/Breeching - Ductwork carrying products of combustion to atmosphere.

PART 2 PRODUCTS

2.01 ELECTRICAL EQUIPMENT

A. Electric Motors

1. Electric motors in NEMA frame sizes shall conform to the requirements in Section 16150, unless otherwise specified herein.
2. The motor manufacturer shall confirm that motors used to power equipment are provided with bearings that will provide a bearing life equal to the driven equipment or better. Confirmation shall be included with shop drawing submittal.
3. Motors will be selected to be non-overloading over the entire operating range of the equipment. A safety factor of 25 percent will be added to all motors up to and including 50 horsepower.

B. Electrical Equipment

1. Electrical equipment which is furnished under this Section shall meet the requirements specified in Division 16:
 - a. Where existing devices do not satisfy requirements of new equipment, disconnect switches, motor starters and combination motor starters (starters with disconnecting means and short circuit protection) shall be provided as required by new equipment manufacturer's specifications.
 - b. Raceways, boxes, fittings and supports shall be as specified in Section 16110.
 - c. Wires and cables shall be as specified in Section 16120.

- C. Electrical enclosures and panels to include automatic temperature control panels and components shall be suitable for the environment and electrical classification for the space they are located in. The type of enclosure for the various spaces shall be as specified in Division 16.

2.02 EQUIPMENT VIBRATION ISOLATOR AND MOUNTINGS

A. General

1. Unless otherwise specified in this Division all machinery or vibrating mechanical equipment shall be isolated from the building structure by vibration isolators with a minimum deflection as specified. Operating equipment that can transmit objectionable vibration and noise must be installed with special types of vibration isolators such as flexible connectors to ductwork, piping and wiring. In more critical areas and under particular conditions, additional vibration isolators shall be installed as specified in other related Sections in this Division, or in specific equipment schedules.
2. All equipment shall be provided with attachment points for floor or suspended mounting that will safely transmit all loads including seismic to the supports.

3. The vibration isolator manufacturer shall be responsible for the proper selection of vibration isolators suitable for the particular application. Selection of the vibration isolator shall include the following factors.
 - a. Equipment Weight
 - b. Equipment operating frequencies
 - c. Type of building support structure
 - d. Seismic forces as required by the applicable building codes to include shear, tension and compression due to the code specified loads.
 4. All floor mounted vibration isolators shall be bolted to the floor or framing on which they rest. Bolts shall be arranged to prevent transmission of vibration through the bolts.
 5. All isolation devices for a single piece of equipment shall be selected for a uniform static deflection according to distribution of weight in the equipment.
 6. All pieces of equipment that have a variation in weight during operation or maintenance such as, but not limited to, cooling towers and hoppers, shall have built-in vertical limit restraints to limit motion to a maximum of 1/4-in.
 7. Isolators exposed to the weather, in rooms that are damp, wet, or corrosive or where required by the Owner shall be provided with corrosion protection. Steel parts other than springs shall be galvanized. Parts subject to wear, rubbing, shall be non-corrosive material such as rubber or stainless steel. Springs and hardware shall be cadmium plated or otherwise provided with an approved coating.
 8. After installation of equipment, isolators shall be adjusted for proper loading and distribution of weight.
- B. Types - The following types of vibration isolators may be used.
1. Isolation Types for Floor Mounting
 - a. Single elastomer-in-shear isolators, molded mound shaped element designed for 1/4-in deflection under the imposed static load. Double elastomer-in-shear isolators shall be two such elements assembled in series or a molded element designed to provide 1/2-in deflection under the imposed static load. Elastomer-in-shear isolators shall be properly housed to prevent bulging and shall be provided with adequate facilities for bolting to equipment and floor slab.
 - b. Spring isolators shall be free standing and laterally stable and shall be equipped with acoustical-friction pads, leveling bolts and bolt holes for anchoring to floor slab. Springs shall have a minimum ratio of outside diameter to operating spring height of 0.8 and an additional travel to solid equal to 50 percent of the specified deflection. Where housed springs are specified or required, provide units with telescoping cast iron or steel housing, containing one or more springs, complete with resilient alignment insert and a minimum of 1/4-in thick rubber or neoprene sound deadening pad bonded to the base of housing.
 - c. Heavy load pads shall be 1-1/4-in thick and shall consist of a high load capacity elastomer pad and sandwiched between two 1/8-in thick steel load distribution plates capable of supporting loads up to 250 psi. For large pad area, steel plates of suitable thickness shall be provided to distribute the load.

- d. Light load pads shall be neoprene corrugated single, laminated double or laminated with 1/2-in thick fine granular composition cork sandwiched between two 1/4-in layers of corrugated, oil resistant neoprene. Pads shall be capable of loading to 50 psi.
2. Isolation for Suspension
- a. Isolation hangers for suspension of equipment and piping shall have a single element of elastomer for 1/4-in deflection, a double or a single molded element of 1/2-in deflection, a single spring element with an elastomer grommet for up to 3/4-in deflection and a combination of an elastomer and spring elements in series for 1-in deflection and up contained within a structural rigid one piece steel hanger box. Springs shall have a minimum ratio of outside diameter to operating spring height of 0.8 and an additional travel to solid equal to 50 percent of the specified deflection.
 - b. The neoprene element shall have a bushing to prevent hanger rod contact with the housing box. The lower rod shall be free to swing in a 30 degree arc without touching the spring or the housing.
3. Rails and Bases - Rails and bases shall be of the following types based on the equipment and deflection required.
- a. Rubber in shear type shall be steel rails running the full length of the supported equipment and extending under any overhang to counteract cantilever effects. The rails shall incorporate single or double deflection elastomer-in-shear fastened in place and a continuous steel floor bearing plate running the full length of each rail. The rails shall be drilled and tapped to accept the supported equipment and shall serve as a template.
 - b. Steel spring type shall be steel rails running the full length of the supported equipment and extending under any overhang to counteract cantilever effects. The rails shall consist of structural members supported by individual free standing springs. The rails shall be drilled to accept the supported equipment and shall serve as a template.
 - c. Fans and their driving motors shall be mounted on structural steel channel members forming a rigid base. A common member parallel to the V-belt drive shall run the full length of the fan and motor and shall be of sufficient rigidity to resist the bending stress of belt pull. The structural steel base shall incorporate single or double deflection elastomer-in-shear elements or free standing springs located for proper weight distribution. The base shall be drilled and tapped to accept the fan and motor and shall serve as a template. Integral motor slide rails shall be provided and welded in place.
 - d. Unless specifically noted in other sections of the specification or on specific equipment schedules, all equipment will be provided with vibration isolation as defined by the following table (units are in inches of deflection):

Condensing Units	Rubber	0.25	--	--	--
	Spring	--	0.75	1.75	1.75
Air Handling Units and Rooftop Units					
10 HP and less	Spring	0.75	0.75	0.75	0.75
15 HP and greater					
4-in S.P. and less	Spring	0.75	1.75	1.75	1.75
4-in. S.P. and greater	Spring	0.75	1.75	1.75	2.50

C. Rigidly Mounted Equipment

1. When equipment does not require vibration isolation, it shall be firmly attached to the building structure. Bolts and support structure shall include allowances for seismic loads as required by the applicable building codes to include shear and moment loads.

D. Vibration Isolation for Piping

1. Pipe runs connected to mechanical equipment as listed below shall be mounted on steel spring and/or elastomer isolators.
2. Floor-supported piping shall be isolated on Peabody Type "S" isolators. Use floor stanchions if required. The steel spring element shall have a static deflection of 1/2-in, except for the first three isolators (supply and discharge pipe) following isolated equipment. The first three isolators shall have a static deflection of at least half the static deflection of the equipment isolators.
3. Ceiling-suspended piping shall be isolated on Peabody Type "SRH" isolators. The elastomer element shall have a minimum static deflection of 1/4-in and the steel spring shall have a static deflection of 1/2-in., except for the first three isolators (supply and discharge pipe) after the isolated equipment. The first three isolators shall have a static deflection of at least half the static deflection of the equipment isolators.
4. For vertical pipe runs, where the pipe has to be guided, a vibration mount shall be used. The mount shall consist of elastomer isolators.

5. Isolators shall be Korfund; Mason; Peabody Noise Control Inc.; Vibration Eliminator Co.; Vibration Mountings & Controls Inc., or equal.

E. Vibration Isolation for Ducts

1. Duct runs connected to mechanical equipment as listed below shall be mounted on steel spring and/or elastomer isolators.
2. The first three supports for ducts shall be connected to supply, exhaust and/or return fans shall be resiliently suspended from spring and elastomer combination hanger equivalent to "Kinetics" Type "SRH." If supported from floor, use "Kinetics" Type "S" with deflections equaling those of fan vibration isolators, but not more than 1.5-in.
3. The remaining ductwork up to a distance of 30 ft. from vibrating equipment shall be suspended or supported by isolators equivalent to "Peabody" Type "FH" or "RH."
4. Isolators shall be Korfund; Mason; Peabody Noise Control Inc.; Vibration Eliminator Co.; Vibration Mountings & Controls Inc.; Vibron or equal.

2.03 FLAME AND SMOKE RATINGS

- A. All materials, including adhesives, surface coatings, sealers, assemblies of several materials, insulation, jacketing, finish, etc, shall have flame spread ratings not over 25 (fire resistive), and smoke development ratings not over 50, as established by tests conducted in accordance with ASTM E84, NFPA 255, and UL 723.
- B. These requirements apply to all circumstances whether the materials are field applied or applied by a manufacturer in his/her shop, or elsewhere, prior to delivery to the project.

2.04 V-BELT DRIVES

- A. V-belt drives shall consist of the driver and driven sheaves and one or multiple matched V-belts. Select V-belt drives with belt horsepower ratings equal to or greater than 1.5 times the driving motor nameplate horsepower. Provide sheaves with steel, cast iron, or malleable iron split taper bushings and keyways on driven shafts of 3/4-in and larger diameter.

2.05 NOISE CRITERIA

- A. The selection of air handling equipment, air conditioners, heating ventilating and air conditioning machinery and mechanical equipment and the installation of the system components such as duct work and piping shall be such as not to exceed to maximum permissible noise for non-equipment spaces as defined in Table 2, Design Guidelines for HVAC System Noise in Unoccupied Spaces contained in the 1995 edition of the ASHRAE Application Handbook. Under no conditions shall the noise created by equipment exceed the levels of permissible noise exposures of occupational areas as established by the OSHA and other Federal, State and local safety and health standards, codes and ordinances.

2.06 BEARINGS

- A. General - Furnish equipment bearings suitable for the intended equipment service. Furnish bearings designed to carry both thrust and radial loads for equipment designed for all angle operation.

- B. Provide extended lube lines with pressure relief equipped grease fittings for all bearings which are not readily accessible from outside the equipment.
- C. Bearings for all equipment in the schedule below shall have heavy-duty grease lubricated self aligning ball or roller bearings. Bearings shall have ample thrust provision to prevent end play during the normal life of the bearing. Unless specifically noted otherwise, all fans shall have bearings for both the equipment and motors with the following ABMA L-50 life.
 - 1. Fans - 100,000 hours.
- D. Belt driven fans, including air handling unit fans shall be equipped with self aligning single row ball bearings, double row tapered or spherical roller bearings.
- E. Provide seals for bearings installed in airstreams, exposed outdoors, and for applications in corrosive or dusty atmosphere.

2.07 HANGERS, SUPPORTS AND ANCHORS

A. General

- 1. Furnish supports, hangers and other devices necessary to support and anchor firmly and substantially the piping, equipment and ductwork described in this Section. Piping and duct support systems shall include restraints as required by the applicable building codes to withstand seismic and wind loading. Design shall be provided by a licensed professional engineer hired by the Contractor as specified in Part 1. Signed and sealed calculations shall be submitted for record purposes.
- 2. All equipment, ductwork, piping, and supports that are installed outdoors shall be designed and installed to meet wind loadings as required by the Georgia Building Codes. Design services shall be provided by a licensed professional engineer as specified in Part 1. All equipment shall be furnished with factory supports and/or tie downs to properly secure the equipment to applicable structure, equipment pad, etc.
- 3. For all outdoor equipment, each equipment manufacturer shall provide a signed and sealed letter certifying that their equipment's unit integrity and anchoring system meet the requirements of the Georgia Building Codes.
- 4. All equipment shall be provided with lugs or brackets to allow the equipment to be firmly fastened to the structure. The lugs and brackets shall be sized to withstand the expected seismic and wind loads for the area and type of application.
- 5. Design of hangers, supports, anchors and hold downs shall include the effect of all loads applied to the equipment, pipe or duct as well as the load of the component. These loads include, but are not limited to wind, seismic and internal dirt or liquid buildup.

B. Hangers and Suspension

- 1. Furnish and install all miscellaneous metalwork in accordance with Division 5 requirements.
- 2. Where C-clamp type hangers are used, furnish with a retainer strap.
- 3. Hangers shall not be supported from roof decking or bulb tees. Where required, provide supplemental steel to span between the building structures.

4. All piping supported at a maximum of 10-ft-0-in intervals. Hangers or rings, sized to fit outside the insulation.
5. All piping 2-in diameter and smaller supported by pipe rings or bands with one 3/8-in adjustable steel rod hanger and one concrete insert.
6. Anchor piping mains where indicated or wherever necessary to limit pipe expansion and to prevent vibration. Furnish anchors constructed of steel securely bolted to masonry and welded to pipes.
7. Rectangular, Round and Flat-Oval Ductwork - Spacing and size of hangers shall be as called for in the SMACNA standards, except as detailed below:
 - a. Rectangular ductwork 48-in wide and larger shall be supported by two adjustable threaded rods.
 - b. Round ductwork 37-in and larger shall be supported by two adjustable threaded rods.
 - c. The following methods of hanger attachment to the building structure are NOT allowed. The numbers and letters refer to hanger methods shown in Figure 4-1, 4-2 and 4-3 of the 1985 edition of the HVAC Duct Construction Standards Metal and Flexible as published by SMACNA.
 - 1) "T" wrap around straps of open web joist.
 - 2) "W" bent over band on open web joist.
 - 3) "14" Friction clamps
 - 4) "17" Bent wire in metal deck.
8. All hanger and fastener material shall be of same finish as ductwork which they serve, e.g., galvanized, aluminum, black steel, etc. When a material other than the duct construction material must be used, the material used must be as corrosion resistant or greater than the duct material.
9. Perforated band iron or wire for supporting ducts shall not be permitted.
10. Support flexible duct by band hangers, 1-in wide minimum, attached so as not to crush the ductwork. The use of wire to hang flexible ductwork shall not be permitted.
11. Duct supports at flexible connections shall be adjustable.

2.08 PAINTING AND COATINGS

- A. Unless otherwise specified, all machinery and factory finished equipment such as pumps, fans, air handling units, air conditioning units, and other items of manufacture shall be hot dipped galvanized or will have a factory applied finish, color as standard with the manufacturer. Components fabricated from stainless steel do not require a coating finish unless otherwise specified.
- B. The Contractor shall be responsible for the repair of all defects, blemishes, holidays and the like apparent in manufactures coatings and shall ensure that the materials used for such repair shall

match and be compatible with the manufacturer's standard color, coatings and practices. Surfaces to be repaired or recoated are to be prepared as recommended by the paint or coating supplier. Care shall be taken not to paint over nameplates.

- C. Furnish touch up paint for the various types of equipment furnished and deliver unopened paint to the Owner at completion of the project. The amount of touch-up paint supplied shall be sufficient to cover 15 percent of the applicable painted surfaces or one pint, whichever is greater.
- D. The equipment Vendor shall test rotating equipment after coating to confirm dynamic balance. If work needs to be done to correct the equipment balance, the integrity of the coating must be corrected after such work.

2.09 TESTING, ADJUSTING AND BALANCING

- A. Furnish the services of an AABC or NEBB certified agency for the testing, adjusting and balancing of all HVAC air systems installed under this Section.
- B. The testing, adjusting and balancing agency shall be independent of all suppliers, installers and contractors on the project.
- C. Refer to Section 15990 Testing, Adjusting, and Balancing for additional requirements.

2.10 INSULATION

- A. Provide insulation adhesives, coatings and vapor barrier materials, which are compatible and recommended, for use by the insulation manufacturer. Submit a certified statement from the insulation manufacturer attesting to their approval of the adhesives, coatings, and vapor barrier materials. The following adhesives and coatings, as manufactured by Foster Div.; H.B. Fuller Co. or Childers Products Co. are representative of approved products that meet the above requirements. (Other manufacturers who demonstrate to the Engineer that their products are equivalent are acceptable.)
 - 1. Lagging adhesive: 30-36, CP50, AMV-1.
 - 2. Vapor barrier coating: 30-35, CP30.
 - 3. Vaporseal adhesive: 85-75, CP82.
 - 4. Duct adhesive: 85-20, CP82.
 - 5. Sealing compound adhesive: 30-45, CP70.
 - 6. Weatherproof mastic: 35-01, CP10-1.
- B. Closed cell foam type insulation applications include, but are not limited to:
 - 1. Refrigerant Piping – Suction Lines
 - 2. Condensate Drain Piping – Air Conditioners
 - a. Insulation Material - Preformed flexible closed cell foam pipe insulation, minimum density 5.5 lbs/cu ft, maximum "K" factor of 0.27 at 75 degrees F mean temperature.

- b. Provide a field applied 0.016-inch aluminum jacket secured with stainless steel straps for all piping.
 - 3. Acceptable manufacturers shall be Armstrong Corp; Manville Corp.; or equal.
- C. Blanket type duct insulation shall include but not be limited to the following:
 - 1. Concealed round and rectangular single wall ductwork.
 - 2. Exposed round single wall ductwork.
 - a. Insulation Material - Fibrous glass insulation, minimum density 1 lb/cu ft and a maximum "K" factor of 0.29 at 75 degrees F mean temperature.
 - b. Facing - Factory applied vapor barrier 0.10 perm consisting of glass fiber scrim reinforced laminated facing of 2 mil aluminum foil and kraft paper.
- D. Fiberglass board type insulation shall include but not be limited to the following:
 - 1. Exposed rectangular single wall ductwork and plenums.
 - a. Insulation Material - Fibrous glass insulation, minimum density 3 lbs/cu ft and a maximum "K" factor of 0.24 at 75 degrees F mean temperature.
 - b. Facing - Factory applied vapor barrier 0.02 perm, consisting of glass fiber scrim reinforced laminated facing of 2 mil aluminum foil and kraft paper.
- E. Closed cell foam type insulation shall include but not be limited to the following:
 - 1. Single wall ductwork mounted outdoors.
 - a. Insulation Material - Flexible closed cell foam sheet, minimum density 5.5 lbs/cu ft and a maximum "K" factor of 0.27 at 75 degrees F mean temperature.
 - b. Provide a field applied 0.016-inch aluminum jacket secured with stainless steel straps for all piping.
- F. Acceptable manufacturers shall be Armstrong Corp; Certain-Teed; Owens Corning; Manville or equal.

2.11 PIPE AND FITTINGS

A. Condensate Drains

- 1. Pipe - Copper tube ANSI H23.1 Type K or ANSI H23.6 Type DWV hard drawn. Fittings - Soldered cast brass or wrought copper drainage fittings ANSI B16.29.
- 2. Solder - 95 percent tin and 5 percent antimony per ASTM B32, Alloy 95TA.

B. Refrigerant Piping

- 1. Pipe - Type K soft drawn copper, precleaned, inert gas filled, and capped. Fittings - Soldered wrought copper.

2. Solder - Hard silver solder with a minimum melting point of 1,300 degrees F. Fit up and solder joints while using an inert gas purge.

2.12 PACKAGED DX (GROUND LEVEL AND ROOFTOP UNITS) WITH GAS HEAT

- A. Acceptable manufacturers are: Trane, Carrier, Lennox.
- B. Outdoor rooftop mounted, electrically controlled heating and cooling unit utilizing a hermetic compressor(s) for cooling duty and gas combustion for heating duty. Unit shall discharge supply air vertically.
- C. Factory assembled, single-piece heating and cooling rooftop unit with energy recovery capability for vertical discharge applications. Contained within the unit enclosure shall be all factory wiring, piping, controls, refrigerant charge (R-22), and special features required prior to field start-up.
- D. Unit Cabinet:
 1. General:
 - a. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a prepainted baked enamel finish on all externally exposed surfaces.
 - b. Cabinet panels shall be easily removable for servicing.
 - c. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
 - d. Unit shall have 2 factory-installed, sloped condensate drain pans made of a non-corrosive material, providing a common connection with a minimum 3/4-in. drain, and shall comply with ASHRAE Standard 62. Condensate drain must be installed per manufacturer's recommendations.
 - e. Unit shall have one factory-installed filter access panel to provide filter access with tool-less removal.
 2. Rooftop Section:
 - a. Evaporator fan compartment interior cabinet surfaces shall be insulated with a minimum 1/2-in. thick, 1 lb density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment.
 - b. Unit shall have standard thru-the-bottom gas and power connection capability (accessory kit is required).
 3. Energy Recovery Section:
 - a. All internal panels shall be primer coated.
 - b. Cabinet interior shall be insulated with a minimum 1/2-in. thick, rigid foam board insulation with foil facing on the air side.
- E. Fans:
 1. Evaporator Fan
 - a. Fan shall be variable-speed, direct- or belt- driven Belt drive shall include an adjustable-pitch motor pulley.
 - b. Fan wheel shall be double-inlet type with forward-curved blades.
 - c. Bearings shall be sealed, permanently lubricated ball-bearing type for longer life and lower maintenance.
 - d. Evaporator fan shall be made from steel with a corrosion-resistant finish and shall be dynamically balanced.
 2. Condenser Fan
 - a. Fan shall be of the direct-driven (with totally enclosed motors) propeller type and shall discharge air vertically.

- b. Fan shall have aluminum blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.
- F. Compressors
 - 1. Rooftop Section:
 - a. Fully hermetic type, 2-stage, internally protected scroll-type.
 - b. Factory mounted on rubber grommets and internally spring mounted for vibration isolation.
- G. Coils
 - 1. Dual compressor models shall have face-split type evaporator coil (circuit no. 1 on bottom).
 - 2. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
- H. Filter Section
 - 1. Rooftop:
 - a. Standard filter section shall consist of factory-installed, low velocity, throwaway 2-in. thick fiberglass filters of commercially available sizes.
 - b. Filter face velocity shall not exceed 320 fpm at nominal airflows.
 - c. Filter section should use only one size filter.
 - d. Filters shall be accessible through an access panel with “no-tool” removal.
- I. Rooftop Heating Section
 - 1. Induced-draft combustion type with energy saving direct-spark ignition system and redundant main gas valve.
 - 2. The heat exchanger shall be of the tubular-section type constructed of a minimum of 20-gage steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.
 - 3. Burners shall be of the in-shot type constructed of aluminum-coated steel.
 - 4. All gas piping shall enter the unit cabinet at a single location on side of unit (horizontal plane).
 - 5. The integrated gas controller (IGC) board shall include gas heat operation fault notification using an LED (light-emitting diode).
 - 6. Unit shall be equipped with anti-cycle protection with one short cycle on unit flame rollout switch or 4 continuous short cycles on the high-temperature limit switch. Fault indication shall be made using an LED.
 - 7. The IGC board shall contain algorithms that modify evaporator-fan operation to prevent future cycling on high-temperature limit switch.
 - 8. The LED shall be visible without removal of control box access panel.
- J. Additional Features
 - 1. Electronic Programmable Light Commercial Humidistat is a fully programmable thermostat with a built-in humidistat.
 - a. Provides direct control of rooftop unit fans in response to occupied/unoccupied output signals.
 - b. Liquid crystal display (LCD) equipment function indicators display operating mode.
 - c. Five-minute compressor delay with override functions.
 - d. Keypad lock feature to prevent unauthorized changing of program control.
 - e. Holiday Mode — With a single touch of a button mode adjusts all comfort levels for optimum efficiency while the home is unoccupied and restores the settings to normal upon return.
 - f. Comfort and energy savings — Seven-day programming with 4 temperature changes and humidity set point changes provided per day, means proper ventilation during occupied periods and savings through reduced energy usage when the building is unoccupied.

- g. Easy to use — Simple instructions are located inside the thermostat's door.
- h. Duplicate Programming — Copy the programmed schedule of one day to the next using the copy function.
- i. Override Capability — Hold function allows the regular schedule to be bypassed with a temporary setting.
- j. Battery-Free — Non-volatile RAM chip requires no battery backup. Retained in memory so reprogramming is not required after power loss.

2.13 SPLIT SYSTEM DX COOLING UNITS WITH GAS FURNACE

- A. Acceptable manufacturers are: Carrier, Trane, Lennox.
- B. In general, all air handling units, package, thru the wall type and split systems shall be factory assembled with cabinet fan, heating and/or cooling section, filters, dampers, access sections with hinged access doors, motor, motor base, drive, drive guard and vibration isolators.
 - 1. Units shall be designed to provide an integrated assembly when all of the components are assembled. All transition sections and filler pieces required between sections are to be provided as part of the unit.
 - 2. Support brackets or rails are to be provided with the unit. Type of support is to be as required by the existing equipment support and existing building construction (e.g. hung, floor mounted, etc.). All air handling units shall be provided with lugs, brackets or field supplied devices to allow the unit to be firmly bolted to the structure or fastened to specified vibration isolators. The lugs, brackets or field supplied devices shall be sized to withstand the expected seismic loads for the area and type of application. Location of the attachments shall be based on the equipment being hung or base mounted in the location where existing equipment is located.
 - 3. Self-contained package units shall also contain compressors, refrigerant piping system, condenser, condenser fans and drives, mounting curb and factory wired control panel.
 - 4. Units not mounted on vibration isolators shall have all rotating components internally isolated from the main unit with vibration isolators.
- C. Casings
 - 1. Casings shall be galvanized sheet steel construction with structural framing members as required. Pressure class rating shall be for the total fan static pressure. All sections of the unit shall be of the same pressure class.
 - 2. The housing shall be constructed of formed and reinforced metal panels, fabricated to allow removal for access to internal parts and components, with joints between sections sealed and continuous seam welded corners. Unit shall be double-wall construction with insulation sandwiched between the panels. Provide with structural framing as required. Interior of unit shall be flush with no internal standing seams or framing extending into the air stream. Seal all seams with high performance polyurethane sealant. Materials of construction shall be as called for in the schedules. The housing shall be coated internally and externally with a gray polyurethane enamel for corrosion resistance. Pressure class rating shall be for the total fan static pressure. All sections of the unit shall be of the same pressure class.
 - 3. Where specified on the schedules, and in all units with heating and/or cooling sections, the unit shall be insulated. All sections including, but not limited to, return plenum, coils, filter,

spacers, access sections, fan cabinet, mixing box and by-pass sections, shall be insulated. Insulation shall be 1-in mat faced or neoprene coated fiberglass liner, 1-1/2 pound minimum density, installed with stick clips and adhesives to prevent erosion of the insulation.

4. Provide gasketed access doors for servicing all components. Access doors shall have a positive-pressure locking latch to provide an airtight seal. Bolts, nuts and shafts for door latches, handles and hinges shall be stainless steel.
5. Where suspended from structure, horizontal units shall be supported on channel supports or provided with brackets.
6. Holes shall be provided in the base rails for rigging shackles to facilitate overhead rigging and forklift slots shall be provided to facilitate maneuvering.
7. Units for outdoor installation shall comply with the following:
 - a. Materials of construction shall be corrosion resistant, or provided with a corrosion resistant coating system for weather protection.
 - b. The casing shall enclose all components for weather protection, with gasketed access doors provided for all sections to facilitate maintenance. Doors shall have provision for key locking to prevent unauthorized tampering.
 - c. Top of housing shall be constructed to prevent buckling and ponding of water.

D. Fan Section

1. Fans shall be centrifugal cabinet fans with belt or direct drive as scheduled. Extended external lubrication fittings shall be provided.
2. On belt driven fans, mount motor on an adjustable slide base, equipped with jack screws.
3. Where scheduled, backwardly curved wheels shall be air foil type.
4. All fans shall be statically and dynamically balanced before shipment.
5. Whenever possible, fans shall be AMCA certified for sound and air performance, per AMCA 210-85 and AMCA 330-86.
6. Where called for on the schedules, fans shall be of spark resistant construction. On spark resistant fans, bearings shall not be placed in the air stream. Construction shall conform to AMCA 99-0401-82 Classification.
7. Fan bearings shall be furnished as specified elsewhere in this Section.

E. Cooling Section

1. Cooling coil section shall be insulated, and provided with with drain pan, coil support slide rails and coil closure plate. Coil mounting shall minimize air by-pass around the coil. Provide insulated drain pan with a corrosion resistant lining and drain connections on both ends of the drain pan.

2. Refrigerant cooling coils shall be cartridge type with copper tubes, aluminum fins, galvanized steel frame, copper suction header and distribution tubes. Fins shall be mechanically attached to the tubes. Coils shall be pressure and leak tested at 300 psig with air under water. Coils shall be certified per ARI Standard 410.

F. Heating Sections

1. Heating section shall be insulated. Where heating is provided by coils, coil support slide rails and closure plates shall be provided.
2. Heating sections shall be in the preheat position.
3. Gas Furnace
 - a. Components shall include: slow-opening gas valve to reduce ignition noise, regulate gas flow, with electric switch gas shut-off; flame proving sensor, hot surface igniter, pressure switch assembly verifies inducer operation; flame rollout switch, drain tubing and installed condensate drain trap, blower and inducer assembly, 40va transformer; low-voltage (heating) (heating/ cooling) thermostat.
 - b. Galvanized blower wheel shall be centrifugal type, statically and dynamically balanced. Blower motor of PSC type shall be permanently lubricated with sealed bearings, and shall be multiple-speed direct drive. Blower motor shall be soft mounted to the blower scroll to reduce vibration transmission.
 - c. Inducer motor shall be soft mounted to reduce vibration transmission.
 - d. Primary Heat exchangers shall be 3-Pass 20 gauge corrosion resistant aluminized steel of fold-and-crimp sectional design, which operates under negative pressure.

G. Filters

1. Filter Box shall have tracks for the specified filter types, except roll filters, to allow filter replacement from either side. Sealing material shall be provided at tracks and ends to prevent air by-passing the filters.
2. Disposable Filters shall be framed filters, 2-in thickness (as scheduled). Filter pressure drop for clean filters at 300 fpm face velocity shall be 0.15-in wg for 2-in thick filters. Filter shall have 30 to 35 percent efficiency on ASHRAE test standard 52-76. Manufacturers and type shall be American Air Filter Co., Am Air 300X; Farr Co., 30/30 Disposable or equal.
3. Bag Filters shall have permanent galvanized steel holding frame and replaceable, non-supported type filter cartridge with a minimum efficiency of 90 to 95 percent on ASHRAE Test Standard 52. Filter pressure drop for clean filters at 500 fpm face velocity shall not exceed 0.55-in WG. Filters shall be UL listed. Filter size shall be as indicated on the schedules. Manufacturers and type shall be American Air Filter Co., Dri-Pak 2100; Farr Co., N/S 200; Cambridge, Hi-Flo 43 x 95 or equal.
4. Rigid Filters shall have permanent galvanized steel holding frame and replaceable type rigid filter cartridge with a minimum efficiency of 90 to 95 percent on ASHRAE Test Standard 52. Filter pressure drop for clean filters at 500 fpm face velocity shall not exceed 0.65-in WG. Filters shall be UL listed. Manufacturers and type shall be American Air Filter Co., Type Varicel; Farr Co., Type Riga-Flow; Cambridge, Type Aeropac or equal.
5. HEPA Filters shall have minimum efficiency of 99.97 percent by DOP test method on 0.3 micron particles. Each filter module shall be 24-in W by 24-in H by 11-1/2-in D nominal size and the pressure drop for clean filters at rated capacity of 1100 cfm shall not exceed 1.0 in

WG. Filters shall be UL listed. Filter holding frames shall be 16 gauge galvanized steel specifically designed for HEPA filters to assure no leakage. Manufacturers and type shall be American Air Filter Co., Astrocell; Farr Co., Magnamedia; Cambridge, Absolute Filters or equal.

6. A total of three complete sets of filter media shall be provided for each unit.

H. Gauges

1. For all types of filters, each filter section shall be provided with a differential static pressure gauge across the filter. Where more than one filter is used in series, each filter shall be provided with a separate gauge. Each gauge shall be provided with shut off-vent valves similar to Dwyer A-301A vent valves on each side of the gauge to permit zeroing of the gauge without disconnecting the gauge. Tubing shall be stainless steel. Static pressure sensors, valves and fittings shall be stainless steel. Pressure range of gauges shall be three times the clean pressure loss of filters provided.
2. Gauges for local indication of indoor units shall be magnehelic gauges accurate to within plus/minus 2 percent of full scale. Gauges shall have a zero adjustment screw and an adjustable set point indicator. Fluid shall be a low specific gravity oil. Oil shall remain functional to minus 20 degrees F. Casing shall be cast aluminum. The unit shall be able to withstand an over pressure of 15 pounds per square inch. Gauges shall be by Dwyer Magnehelic Series 2000 or equal.
3. Gauges for local indication of outdoor units shall be combination vertical/inclined manometer type. Gauges shall have zero adjustment screw and set point indicator. Casing shall be one piece plastic and epoxy coated aluminum scale. A weatherproof housing shall be provided for protection of the unit from direct sun light. Gauges shall be Dwyer Mark II No. 25 inclined manometer or equal.
4. Remote indication of pressure differential shall be provided by a transmitter using silicon strain gauge transducer. Casing shall be cast aluminum. The unit shall be able to withstand an over pressure of 15 pounds per square inch. Unit shall have zero and span adjustment. The transmitters shall be provided with an LCD readout on the face of the transmitter. Transmitters shall be Dwyer Series 603A differential pressure transmitter.

I. Condensing Unit

1. Condensing unit shall consist of casing, compressor(s), refrigerant piping system, condenser, condenser fans and drives and factory wired controls and panel.
2. All rotating components shall be internally isolated with vibration isolators from the main unit.
3. Condenser section for self contained package units shall be an integral part of the unit and shall be part of a complete factory assembled unit.
4. Condensing unit for split systems shall be designed and constructed for mounting remote from its associated air handler with field fabricated interconnecting refrigerant piping, including associated specialties.
5. Refrigerant compressors shall be of the type, number, and capacity specified on the schedules. Compressors shall be provided with unloading or hot gas by-pass as required by

the schedule. Compressor shall include suction strainer, crank case oil sight glass, oil strainer and oil heater and forced feed lubrication. Compressor controls shall include three-phase manual reset overload protection, hi-low refrigerant pressure cutout, manual reset low oil pressure cutout, non-cycle pump down relay. In addition multiple compressor units shall have a compressor sequence switch.

6. Air cooled condenser shall have propeller or centrifugal fans as shown on the schedules. Exposed fans shall be provided with fan guards. Coils shall have copper tubes, aluminum fins, galvanized steel frame and copper headers. Fins shall be mechanically attached to the tubes. Coils shall be pressure and leak tested at 425 psig with air under water.

J. Heat Pump Units

1. Heat pump units shall include reversing valve and required controls to operate as a heat pump. Units shall incorporate an outdoor coil defrost system to prevent excessive frost accumulation during heating duty. Defrost shall be initiated on the basis of time and coil temperature. A 30/50/90-minute timer shall activate defrost cycle only if coil temperature is low enough to indicate a heavy frost condition. Defrost cycle shall terminate when defrost thermostat is satisfied and shall have a positive termination time of 10 minutes. Compressor with standard controls shall be capable of cooling operation down to 25 degrees F ambient outdoor temperature. Compressor shall be capable of operation in heating duty down to minus 10 degrees F ambient outdoor-air temperature. Units shall be capable of simultaneous heating duty and defrost cycle operation when using electric heaters.

K. A complete refrigerant piping system shall be factory fabricated and installed in the unit. Each compressor shall be provided with a complete and independent refrigerant piping system.

1. Piping shall be Type K copper tubing with joints silver brazed. Brazing shall be done with an inert gas purge. Suction lines shall be insulated with closed cell foam insulation. Hot gas piping shall be insulated to protect personnel as required.
2. Valves shall be bronze body brazed connection and shall include compressor and condenser relief valves, condenser liquid line service valve, refrigerant charging valve, compressor discharge, suction service valves, liquid line solenoid and thermal expansion valve.
3. Complete refrigerant system shall be cleaned, leak tested and charged with refrigerant.
4. Size of field fabricated piping for split systems shall be determined by the equipment manufacturer.

L. Unit Control Panel

1. For self-contained package units, split systems and fuel burning units, factory wired control panel shall be furnished and mounted on the unit. Panels shall include all controls required in other sections and all safety controls and interlocks, heavy duty fused visible break disconnect, control devices, motor starters and terminal strip for remote wired devices. Control voltage shall not exceed 120 Volts. Control panel door shall be provided with a keyed lock. A complete wiring diagram shall be permanently attached to the inside of the panel door. Step control sensors and step controller will be provided under the temperature control portion of the specification unless specified with unit on the equipment schedule.

2. Where specific area classifications are required, all equipment and wiring shall be in conformance with the requirements for that classification.
3. The type of enclosure shall be as specified in Division 16.

M. Accessory Sections

1. Accessory sections shall be same as for existing systems.
2. Furnish steel dampers in accordance with requirements specified under ATC Equipment elsewhere in this Section. Mixing box dampers shall be parallel blade type and where dampers are used for outdoor air shutoff service, they shall be low leakage type. Manual dampers shall be provided with an external position indicating handle with a positive locking device.
3. Dampers shall be opposed blade type with blades mounted on 1/2-in minimum steel rods. Dampers shall be provided with low friction bushings and edge gaskets to reduce air leakage. Blades shall be sectionalized to limit unsupported blade length and warping at full system fan static pressures. Maximum damper blade width shall not exceed 6-in. Manual dampers shall be provided with an external position indicating handle with a positive locking device.
4. Deflection plates shall be provided if required to maintain even air flow over coils and prevent stratification.
5. Spacer and access sections will be provided where specified or required. Access sections shall have hinged doors on each end except for filters.
6. Inlet and discharge louvers for outdoor mounted units shall be weatherproof design.
7. Factory fabricated insulated curbs shall be provided where existing supports/curbs must be replaced to fit new equipment and existing construction. Curbs shall be galvanized steel construction with corrosion resistant coating. Unless otherwise specified, curbs shall include provisions for supply and return air duct and piping connections to the area below. Where the roof is pitched the curb shall be constructed to match the pitch and provide a level surface at the top of the curb for the unit to mount on.

2.14 DUCTWORK

- A. Sheet metal ductwork shall be constructed of the materials specified using the gauges or thicknesses and reinforcing called for by SMACNA for the material specified. Unless otherwise specified, all components of duct systems shall be constructed of the same material as the ductwork. This is to include braces and turning vanes.
 1. Galvanized steel ductwork shall be constructed of hot-dip galvanized sheet steel, per ASTM, A525 and A527.
- B. Ductwork shall be constructed of the following materials and to the following standards:

<u>System</u>	<u>Location</u>	<u>Static Pressure</u>	<u>Construction Material</u>	<u>SMACNA Standard</u>
ALL	ALL	ALL	GS	M&F

Abbreviations

- M&F - SMACNA HVAC Duct Construction Standards - 1st Ed. - Metal & Flexible
- IRD - SMACNA Round Industrial Duct Construction Standards
- IRT - *SMACNA Rectangular Industrial Duct Construction Standards*
- TP - *SMACNA Thermoplastic Duct (PVC) Construction Manual - 1st Ed.*

** except where listed otherwise in this table*

- GS = Galvanized Steel
- SS = Stainless Steel

- C. Design of ductwork shall include all loads applied to the ductwork, in addition to the load of the duct. These loads include but are not limited to wind, snow and internal dirt or liquid buildup.
- D. Construction
 - 1. All ductwork shall be substantially built with joints and seams smooth on the inside and given a neat appearance on the outside. Inside surfaces and joints shall be smooth and free from pockets, burrs and projections. All joints shall be substantially air tight with laps made in the direction of air flow and no flanges projecting into the air stream. All changes in direction and duct transitions shall be shaped to permit the easiest possible air flow.
 - 2. Pressure Classes
 - a. Pressure classes for determination of sheet metal gauge and reinforcing shall be as defined by the latest issue of the SMACNA standards for duct construction.
 - b. For ductwork with a static pressure 2-in water gauge or less, the pressure class shall be the same for the entire length, including branches, of the specific duct system.
 - 3. Rectangular Ductwork
 - a. Ductwork shall be constructed in accordance with the specified SMACNA Construction Standard, latest edition.
 - b. Cross-breaking shall conform to SMACNA Standard. Cross-breaking shall be applied to the sheet metal between the standing seams or reinforcing angles. The center of the cross-break shall be of the required height to assure rigidity for each panel.
 - c. All square elbows for rectangular ductwork shall be provided with turning vanes. Turning vanes shall be as detailed in the SMACNA Manual.
 - d. Alternate Construction (Rectangular Only) - Factory-fabricated joint systems may be offered as an alternate form of construction. The system offered shall meet all requirements of SMACNA. Alternate joint systems shall be "Ductmate System" as manufactured by Ductmate Industries, Inc., installed in accordance with the manufacturer's recommendations. The system shall be sealed for zero leakage and angle attachment to the main duct section shall be by tack welding. The use of screws is not allowed.
 - 4. Round Ductwork

- a. Ductwork shall be constructed in accordance with the specified SMACNA Construction Standard latest edition.
- b. Round Ductwork
 - 1) Round ductwork shall be either lock type, welded longitudinal seam construction or spiral ductwork.
 - 2) Gauges of ductwork and fittings shall be as specified in SMACNA. Draw bands will not be permitted. Slip joint shall be used on ductwork up to 36-in in diameter and the "loose flange" or Vanstone joint shall be used on ducts over 36-in in diameter.
 - 3) All seams and joints shall be continuously welded.
 - 4) Round ductwork shall be manufactured by United Sheet Metal; SEMCO or equal.
- 5. Round Ductwork Fittings
 - a. All 90 degree turns shall be made of five piece mitered welded construction made by the manufacturer of the conduit. Fittings less than 90 degrees in the riser shall be made of multiple pieced mitered welded construction.
 - b. All fittings in the round duct system shall be of the male and female type and in assembling these together, there shall be applied an approved synthetic rubber sealing compound on the joint. Also, on the outside of the duct apply this synthetic rubber sealing compound in order to further make these joints air tight. Mechanically fasten the conduits together using sheet metal screws not less than four per fitting 6-in on centers maximum and equally spaced around the circumference of fitting.
 - c. Round duct fittings shall be manufactured by United Sheet Metal; SEMCO or equal.
- 6. For duct lining, see Ductwork Installation; PART 3.
- 7. Round Flexible Ductwork
 - a. Aluminum flexible ductwork shall be self supporting, suitable for both high and low velocity systems. Duct shall be "United Flex" as manufactured by United Sheet Metal.
 - b. Stainless steel flexible ductwork shall be self supporting, suitable for both high and low velocity systems. Duct shall be "United Flex" as manufactured by United Sheet Metal.
 - c. Fabric flexible ductwork shall be vinyl coated glass fabric with cold rolled flat steel spiral support. Duct shall be suitable for both high and low velocity systems. Duct shall be Type 57 as manufactured by Wiremold Co. or equal.
 - d. Connections, joints, and termination shall be made air tight as recommended by the manufacturer. Where joints are made to rigid sheet metal ductwork, 3M Company EC-800 sealer shall be applied and the joint shall be drawn tight with a drawband.
 - e. Maximum length shall be 14-ft. The remainder shall be sheet metal. Duct run shall be as short and straight as possible to minimize static pressure resistance.

8. Insulated Round Flexible Ducts

- a. Round flexible ducts shall comply with specified SMACNA Construction Standards and be constructed of corrugated ductile aluminum that can be bent and rebent by hand and is self-supporting. 1-in insulation shall be applied around the outside and be finished with a vinyl cover.
- b. Thermal conductivity of the insulation shall not exceed 0.27 BTU/hr/sq ft/1 degree F at 75 degree mean temperature. Duct shall be Class I, per UL 181.
- c. Maximum length shall be 5-ft. The remainder shall be galvanized sheet metal. Duct run shall be as short and straight as possible to minimize static resistance.
- d. Ducts shall be Bendway as manufactured by Flexaust Company or equal.

9. Volume Dampers

- a. Dampers shall be standard opposed or parallel multi-blade type on 2-in channel frame, flanged connection with external damper position indicator, manual adjustment, and position locking arrangement. Damper blades shall not exceed 6-in in width. Dampers shall be constructed of the same material as the ductwork, or of a material of equal corrosion resistance. Balancing and balancing/shutoff dampers shall be opposed blades and shutoff dampers shall be parallel blade.
- b. Locking quadrants shall have a positive method of holding the damper in its selected position such as a bolt through both the quadrant and the lever arm. Systems using springs or other devices that can vibrate loose are not acceptable.
- c. Where manual dampers are used for shut off service, dampers shall have a replaceable butyl rubber or bulb vinyl seals provided with the damper. Install seals along the top, bottom and sides of the frame and along each blade edge.

10. Access Doors

- a. Access doors shall be 24-in by 24-in minimum, except where the duct size is less than 26-in, where the largest door that will fit the duct will be used. Unhinged access panels are not acceptable. Access doors shall be of the same material as the duct, pan type construction for metal ductwork, with smooth edges and fitted seals, constructed and installed for air-tight fit with ease of opening and closing. Doors shall be substantially butt hinged, with heavy sash locks and substantial door pulls. Door openings and door frames shall be reinforced with bar stock or angle. Where ductwork is installed with duct liner or exterior duct insulation, the access door shall be of the insulated type. Access doors may be factory fabricated. Where ductwork is constructed of aluminum or stainless steel, access door hardware shall be of similar material.

11. Fasteners

- a. Sheet metal screws, drive cleats, cinch bands and other fasteners shall be fabricated from materials with an equal or greater corrosion resistance than the ductwork in which they are installed. Where a material other than the duct material is used, it shall be approved by the Engineer before installation.

- A. Fire and smoke dampers shall meet local codes and the requirements of the NFPA Pamphlet No. 90A.
- B. Dampers shall be designed and tested for their specific application in the system. Dampers shall be suitable for the following services:
 - 1. Fire dampers for systems that are automatically shut down in the event of a fire.
 - 2. Fire dampers for systems that are operational in the event of a fire.
 - 3. Smoke dampers activated by smoke sensors.
 - 4. Combination fire and smoke dampers where both types of dampers are required in the same location.
- C. Dampers shall be sized so that the free air space is not less than the connected duct free area. Location shall be as required by code.
- D. Fire dampers shall have a minimum 1-1/2 hour standard fire protection rating in accordance with NFPA Pamphlet No. 252 and UL-555. Where the fire protection rating of the partition exceeds 2 hours, multiple dampers in series may be used to provide a rating equal to the partition. Dampers with fusible links shall be arranged to close automatically and remain tightly closed upon the operation of a UL approved fusible link or other approved heat actuated device, located where readily affected by an abnormal rise of temperature in the duct. Fusible links shall have a temperature rating of 50 degrees F above the maximum normal duct operating temperature, but not less than 165 degrees F.
- E. Smoke dampers shall be located as required by Codes and shall interface with the smoke detection system. Dampers shall comply with UL 555S.
- F. Workmanship - Install dampers in sleeve unless specifically approved otherwise by the Engineer. Fire and smoke dampers shall be installed to provide a positive barrier to passage of air when in a closed position. Dampers shall be installed so they will be self-supporting in case of duct destruction due to heat. Care shall be exercised that the frame be set so that the closing device will not bind. Damper operators for fire and smoke dampers shall be spring to close and shall be as specified in the automatic control systems.
- G. Factory fabricated, steel-curtain type, UL approved fire dampers, with damper blades out of the air stream. These fire dampers shall be tested and installed in accordance with the manufacturer's instructions and the latest editions of UL 555 and UL 555S. Damper operators shall be factory installed and tested. Operators shall not be removed and reinstalled or installed in the field.
- H. Access Doors - Tight fitting access doors shall be provided for accessibility to dampers and fusible links for inspection and maintenance.
- I. All fire and smoke dampers shall have written approval from local authorities.
- J. Instrument ports and mounting holes for sensors, indicators, flow switches, detectors, gauges and other items to be mounted on the ductwork by the automatic control contractor shall be coordinated with the ATC Equipment provided under this Section. Mounting shall be in accordance with the automatic control contractor's and the manufacturer's instructions.

2.16 WEATHER HOODS

- A. Weather hoods shall be a factory-fabricated and assembled sheet metal housing. Air intake hoods shall have a pleasing contour and a minimum free area for the handling of outdoor air at a maximum of 500 fpm. Weather hoods shall consist of a "dome" or "mushroom" head, a stack section and a base for mounting of the entire unit over a curbed roof opening. Weather hoods shall be of substantial construction with rigid framing, bracing and supports. Weather hoods shall be of all aluminum construction, low silhouette. All hoods shall be provided with bird screens of 1/2-in mesh, welded wire, galvanized. Provide anti-condensation coating on internal surfaces.
- B. Air Intake Roof Hoods - Acceptable equipment shall be GRS Series by Greenheck Fan Co.; Trim Line-Skymaster by Acme Engineering & Manufacturing Corp.; Carnes or equal.

2.17 ROOF CURBS

- A. Roof curbs shall be furnished for all roof mounted HVAC equipment including fans and relief vents.
- B. Roof curbs shall be pre-fabricated type, minimum 12-in height and sized to match the dimensions of the equipment base supported. Curbs shall provide a horizontal mounting surface for the equipment and shall be designed to allow for roof slope where applicable.
- C. Curbs shall be straight sided type of all aluminum welded construction with nominal 2-in thick acoustical/thermal insulation in curb walls. A perforated metal liner shall be provided to protect the insulation.
- D. Curb interiors shall be provided with protective coatings when a coating is specified for a particular fan. Refer to Fan Schedules for applicable units.
- E. Roof curbs shall be "Sonotrol" type as manufactured by Penn Ventilator Co. or equal.

2.18 DX UNITS CONTROLS

- A. Thermostats
 - 1. Electronic, 7-day (four schedules per day) fully programmable room thermostat. All functions of thermostat(s) shall be capable of remote Internet control through control wiring connected to a local Ethernet, or through wireless radio-frequency (RF) connection to local Ethernet.
 - 2. Contractor shall provide all labor and materials, including software, to make all thermostats operational across Owner's Ethernet. Contractor shall provide software Owner may use to access and control thermostats remotely through the internet.
 - 3. Temperature sensors shall be of the wire-wound resistive element type (RTD) using either nickel or platinum alloy as the resistive element. All temperature sensors shall have an end to end (element to readout display) accuracy of plus or minus 0.5 degree F.
 - 4. Room thermostat and temperature sensors mounted on exterior walls shall be provided with insulated mounting plates.
 - 5. All room thermostats and sensors shall be mounted 5-ft-6-in above finish floor except where specified herein.
 - a. All room thermostats located in Administrative areas shall be mounted 4-ft-0-in above finish floor or as required by the ADAAG.
- B. Static Pressure Sensors - Shall be adjustable, set point proportional type, with adjustable range in inches of water to meet the performance or function specified.
- C. Ionization Type Smoke Detectors (Four Wire Type)
 - 1. Furnish and install ionization type smoke duct detectors in the supply air duct and return air duct or plenum of each air handling unit and in the exhaust air duct of systems which exhaust greater than 50 percent of the supply air. This applies to all air systems of 2000 cfm or greater.

2. The detector housing shall be listed per UL 268A specifically for use in air handling systems. The detector shall operate at air velocities of 500 to 4000 feet per minute. The detector housing shall be equipped with an integral mounting base capable of accommodating either photo electronic or ionization detector heads. It shall be capable of local testing via remote testing station. The duct detector housing shall incorporate an airtight smoke chamber in compliance with UL 268A, Standard for Smoke Detectors for Duct Applications. The housing shall be capable of mounting to either rectangular or round ducts without brackets. An integral filter system shall be included to reduce dust and residue effects on detector and housing, thereby reducing maintenance and service.
3. Detectors shall be provided with two sets of contacts to provide smoke alarm signals. One is to be used by the ATC systems, and the second is for use in Division 16 for interface to fire alarm system.
4. Remote test switch and alarm indicator stations shall be furnished for all duct smoke detectors as specified above. The installation and wiring of the remote stations will be provided under this Section. The remote test stations shall be wall mounted within the visible location of the smoke detector and easily accessible from the floor. Alarm indicator stations shall activate a visible and audible signal upon smoke detector activation. Alarm indicator stations shall also activate a visible or audible signal identified as AIR DUCT DETECTOR TROUBLE upon smoke detector trouble conditions. Alarm indicator stations shall be mounted in a location approved by the Authority having jurisdiction.
5. Provide all necessary relays, transformers and other devices as required.
6. Where multiple units serve the same space, the smoke detectors shall be wired such that any smoke detector will shut down all units serving the space.

D. Dampers

1. All damper frames are to be constructed of the same material as the duct or a material with greater corrosion resistance sheet metal and shall have flanges for duct mounting. Damper blades shall not exceed 6-in in width. All blades are to be of corrugated type construction, fabricated from two sheets metal, spot welded together. Blades are to be suitable for high velocity performance. Maximum blade length in any section shall be 48-in. Additional stiffening or bracing shall be provided for sections exceeding 48-in in height. Multi-section dampers shall be provided with sufficient interconnecting hardware to provide unison operation of blades in the entire assembly.
2. All damper bearings shall be made of nylon.
3. Replaceable butyl rubber or bulb vinyl seals are to be provided with the damper. Seals are to be installed along the top, bottom and sides of the frame and along each blade edge. Seals shall provide a tight closing, low (1 percent) maximum leakage damper.
4. Dampers shall be selected for the velocity and pressure differential required without excessive deflections.
5. Modulating dampers shall be of opposed blade construction. Dampers for two position operation may be single direction multiple-leaf type.

6. Dampers may be furnished for in-duct mounting and with face linkages if the following conditions are met.
 - a. Service is for supply or makeup air in either process or non-process areas or service is for return or exhaust of non-corrosive air.
 - b. Space is available to install a 24 by 24 (minimum) access door in the duct on the linkage side of the damper.
7. Dampers shall be furnished for flange mounting with exposed jamb mounted blade linkages for any of the following applications:
 - a. Where installation clearances do not allow the installation of full size access doors to allow inspection and adjustment of face linkages.
 - b. For corrosive, dirty or particle laden air service.

E. Electronic Damper Actuators

1. Electronic actuators, less than 600 in-lb of rated torque, shall have ISO 9001 quality certification and be UL listed under standard 873, CSA C22.2 No. 24 and have CE certification. Electronic actuators used on dampers shall be designed to directly couple and mount to a stem, shaft or ISO style-mounting pad. Actuator mounting clamps shall be a V-bolt with a toothed V-clamp creating a cold weld, positive grip effect. Single point, bolt or single screw actuator type fastening techniques or direct-coupled actuators requiring field assembly of the universal clamp is not acceptable.
2. Actuators shall be fully modulating/proportional, pulse width, floating/tri-state, or two position as required and be factory or field selectable. Actuators shall have visual position indicators and shall operate in sequence with other devices if required. Proportional actuators shall be capable of digital communication, as built.
3. Two sets of DPDT switches with fully adjustable set points shall be provided to activate panel indicators and provide signals for equipment operation.
4. Actuator shall have an operating range of minus 22 to 122 degrees F.
5. Proportional actuators shall accept a 0 to 10 VDC or 0-20 mA input signal and provide a 2 to 10 VDC or 4-20 mA (with a load resistor) operating range.
6. Actuators shall be capable of operating on 24, 120 or 230 VAC or 24 VDC and Class 2 wiring as directed by the application. Power consumption shall not exceed 10 VA for AC, including 120 VAC actuators and 8 watts per actuator for applications
7. NEMA 2 rated actuators shall be provided with a three foot (minimum), prewired, electrical cable. Actuators requiring removal of the actuator cover for access to wiring terminals, exposing electronics, printed circuit boards to damage, are unacceptable.
8. Actuators shall have electronic overload protection or digital rotation sensing circuitry to prevent actuator damage throughout the entire rotation. End switches to deactivate the actuator at the end of rotation or magnetic clutches are not acceptable.

9. For power-failure/safety applications, an internal mechanical spring return mechanism shall be built into the actuator housing. Spring return actuators shall be capable of CW or CCW mounting orientation. Spring return models >60 in-lb will be capable of mounting on shafts up to 1.05-in diameter. Spring return actuators with more than 60 in-lb of torque shall have a manual override metal crank. Upon loss of control signal, a proportional actuator shall fail open or closed based on the minimum control signal. Upon loss of power, a non-spring return actuator shall maintain the last position.
10. Actuators using “on-board” chemical storage systems, capacitors or other “on-board” non-mechanical forms of fail-safe operation are unacceptable.
11. Actuators shall be capable of being mechanically and electrically paralleled to increase torque if required. Dampers requiring greater torque or higher close off may be assembled with multiple low torque actuators. Dual mounted actuators using additional anti-rotation strap mechanical linkages or special factory wiring to function are not acceptable. Actuators in a tandem pair must be “off the shelf” standard actuators ready for field wiring.
12. Dampers actuators will not produce more than 62 dbA when furnished with a mechanical fail-safe spring. Non-spring return actuators shall conform to a maximum noise rating of 45 dbA with power on or in the running or driving mode.
13. Proportional actuators shall be fully programmable. Control input, position feedback and running time shall be factory or field programmable. Diagnostic feedback shall provide indications of hunting or oscillation, mechanical overload, mechanical travel and mechanical load limit. The actuators shall also provide actuator service data, at a minimum, number of hours powered and number of hours in motion.
14. Where special classifications are required, damper actuators shall be provided with suitable enclosures.
15. NEMA 4X enclosures shall be Type 304 stainless steel and shall have a shaft seal and all electrical connections shall be suitable for the space classification. Enclosure shall be UL listed.
16. Explosion-proof enclosure shall be suitable for Class I, II and III. A suitable shaft seal must be provided. Housing shall be cast copper fill aluminum with stainless steel fasteners and shall be UL listed. Housing shall be suitable for NEMA 4, 7 and 9.

F. Local ATC Panels

1. Where required by equipment, provide local control panels as needed to control all functions of equipment. Local control panels shall be remotely controlled through Internet/Ethernet wiring, and through building management system (where exists). All controllers, relays, switches, etc, for equipment shall be mounted within control panels.
2. Submit details of each panel for approval prior to fabrication. Locations of each panel are to be convenient for adjustment and service. Provide engraved nameplates beneath each panel mounted control device clearly describing the function of said device and range of operation.
3. All electrical devices within the panels shall be factory pre-wired. All wiring within the panel shall be in accordance with NEMA and UL standards and shall meet all local codes.

4. Unless otherwise specified herein, control panels shall meet the requirements for Electrical Products specified elsewhere in this Section.
 5. Electrical power supplied to control panels shall be as required by Controls manufacturer.
 6. Provide a copy of the control diagram for each panel.
- G. Miscellaneous Devices - Provide all the necessary relays, limit switches, positioners, clocks, transformers, etc, to make a complete and operable system.
- H. Name Tags - All sensing devices, transmitters, controllers, not mounted in a clearly labeled panel, or which are not an obvious part of a clearly labeled device, shall be provided with an engraved plastic plate containing the name, function and system or system number for the device.
- I. Control devices shall be adjustable above and below initial set points. If a set point is not stated, the control range of devices shall be suitable for the intended service. Range of devices shall be approximately 50 percent greater in both directions than span of variable, with a minimum of 25 degrees and a maximum of 100 degrees F for air systems.
- J. Electronic Sensors
1. All mixed air and coil discharge sensors shall utilize industry standard 4-20 mA sensors with averaging elements. Sensing elements shall be a minimum of 25-ft and temperature sensed shall be averaged over the entire length of the element. Thermistor type sensors will not be acceptable for this application.
 2. Space type sensors shall have an accuracy of plus/minus .5 degrees over sensed temperature range (20 to 120 degrees F).
 3. Well type sensors used for liquid immersion shall have stainless steel removable wells. Sensing element shall have an accuracy of plus/minus .5 degrees over range (70 to 220 degrees F or 20 to 120 degrees F) of the sensor. Each sensor shall have a suitable electrical box to enclose all wiring connections.
 4. Temperature control wells shall be installed by the HVAC Contractor under supervision of the temperature control contractor.
- K. Field Wiring
1. All field wiring, other than power wiring, between control panels, control devices and control terminals in motor control centers shall be furnished under this Section and shall conform to the requirements of Division 16.
 2. All interlocking wiring within MCC shall be installed under Division 16.
 3. Installation of all conduit, wire, sleeves, outlet boxes, insulating bushings, system cabinets, terminal boxes, pull boxes, junction boxes, inserts, anchors, system devices, etc, shall be in accordance with the appropriate requirements of Division 16 and in accordance with the requirements of the current edition of the local codes for signal systems and electrical systems.

4. Run wiring in rigid steel conduit except in dry locations above ceilings and wood or metal stud framed partition walls, where EMT may be used. Conduit, boxes and fittings and their installation and testing shall be as specified in Section 16110.
5. Wire, with the exception of DDC cable and thermostat wire, shall be copper type THHN/THWN insulated for 600 Volts. Wire and its installation and testing shall be as specified in Section 16120.
6. In the event of any conflict among referenced codes, current editions of the applicable local codes shall take precedence for interpretation of "Signal System" installation requirements.
7. Installation of sensor wiring in finished areas shall be concealed whenever possible. Where concealed wiring is not possible, written approval for exposed work must be obtained from the Engineer prior to installation.
8. A power supply 115V, single phase, 60 Hz, 20 Amp circuit for Controls, requirements will be available at each local control panel. Power shall not be taken from the control power transformers of the motor control center.
9. Coordination Issues
 - a. The electrical contractor will provide a 120V circuit to all control panels. Power for the control systems is to be taken from the panels and no other source.
 - b. Flow alarms that require line voltage electric power to operate are to be furnished and installed under this Section. Units shall be powered by 120 Volt, single phase, 60 Hz power taken from the control panel. The flow alarms shall be provided with two sets of contacts. One set will be wired by the electrical contractor for the instrumentation system. The second contact will be used to provide an HVAC signal which will be wired under this Section.
 - c. Alarms from the HVAC systems that provide a signal to the central control system will be furnished and installed under this Section. The alarms shall be provided with two sets of contacts. One set will be wired by the electrical contractor for the instrumentation system. The second contact will be used to provide an HVAC signal which will be wired under the Section.
 - d. The electrical contractor will provide an NO contact input to the generator room ATC panel to indicate operation of the generator for use in the control sequences.
 - e. The following wiring is to be done under this Section:
 - 1) Between equipment control panels and MCCs.
 - 2) Between alarm devices provided by the other trades and control panels.
 - 3) Power wiring from the control panels to smoke detectors and flow sensors.
 - f. Wiring from smoke detectors provided under this Section to the building fire alarm systems will be provided under Division 16.

- L. Software licensing and user agreements shall be based on a one-time fee. Agreements that remove all responsibility for the software and its performance are not acceptable.

2.19 SEQUENCE OF CONTROLS

A. General

1. HVAC equipment will operate with the following sequences of operation.
2. The following will apply to all sequences.
 - a. All sequences are reversible unless otherwise noted.
 - b. Manual reset of control functions with manual reset will be at the local control panel unless otherwise noted.
 - c. Where required to prevent nuisance shut downs of systems, provide time delay of sensors to allow system start up before the sensors are activated. This would include, but not be limited to low temperature freeze protection on 100 percent outdoor air units.
 - d. For fan systems with shut off dampers and air flows greater than 2000 cfm and fan operating static pressure greater than 1-in water gauge, fans shall be stopped and started by damper end switches. When the sequence calls for the fan to run, the control system shall open the respective damper. When the damper is open as indicated by an end switch on the damper the fan shall start.
 - e. Where control sequences refer to activation of an alarm indicator, it will be understood to mean activation of a labeled pilot light at the local ATC panel. A dedicated pilot light will be provided for each alarm unless a common alarm light is specified.
 - f. The ATC contractor shall provide all connections, relays and other devices required to operate the system under the control of the firefighter control panel.

PART 3 EXECUTION

3.01 INSTALLATION

- A. The Contractor shall start up each piece of equipment and system and shall make all adjustments so that the system is placed in proper operating condition.
- B. The Contractor shall not install any equipment or materials until the Owner and Engineer have approved all submittals. If any equipment or materials are installed prior to approval of the submittals, it shall be at the Contractor's risk.
- C. Equipment
 1. Install equipment in accordance with manufacturer's recommendation. Provide piping and ductwork connections in accordance with the requirements as specified elsewhere in this Section.
 2. When units are shipped disassembled, field connect all sections together to form single air handling unit. Seal all joints with gaskets and/or sealants.

3. Do not operate equipment without filters. Do not run equipment with dirty filter pressure drop more than twice clean filter pressure drop. A total of three complete sets of filters shall be provided. The first set is to be installed for start-up, test and balancing. The second set shall be installed after final cleanup and acceptance by the Owner. The third set shall be turned over to the Owner as a spare.
4. The Contractor shall start up each piece of equipment and system and shall make all adjustments so that the system is placed in proper operating condition.

D. Insulation - General

1. Do not apply insulation prior to testing and acceptance of piping, ductwork and/or equipment. Insulation shall not be applied to damp or frosty surfaces. Clean dust, dirt, grease and moisture from surfaces of pipe and ducts before applying insulation or insulation adhesives. Install all insulation in a neat and workmanlike manner. Nameplates and equipment certification and data tags affixed to any piece of apparatus must remain exposed to view. Where two layers of insulation are used, stagger all joints both ways. Secure each layer independently. Continue insulation through walls, partitions, floors and pipe sleeves.
2. The recommendations and instructions of the manufacturers of products used in the work are hereby made part of this Section except as they may be superseded by other requirements of this Section.
3. Adhesives, coatings and vapor barrier materials shall be applied as specified by the manufacturer. Do not apply these materials when ambient temperature is above or below the maximum and minimum ambient temperature respectively, specified as limits by the manufacturer. In general, these limits are 90 degrees F and 40 degrees F, however, the limitations are to be checked for each product.
4. All penetrations through a vapor barrier for hangers, instruments, etc, shall be sealed to provide a complete vapor barrier. The use of staples or other fasteners that penetrate the vapor barrier shall not be permitted.
5. Insulation systems that require a vapor barrier shall be installed with an intact vapor barrier that covers the entire pipe, duct, or piece of equipment to be insulated. All edges of insulation that do not abut another piece of insulation shall have the vapor barrier extended, and sealed to the item being insulated. All penetrations through the insulation such as for thermowells, test ports, dampers, nameplates, or other items shall have the vapor barrier extend over the edges of the insulation and sealed to the item being insulated. Where items are mounted on ductwork a standoff shall be provided to protect the vapor barrier. The vapor barrier shall be sealed to the standoff.
6. For insulated items exceeding 100 square feet, or 20 feet in length, extend the vapor barrier to the item being insulated to reduce the area or length within a single enclosed area to the dimensions listed above.

E. Piping Insulation Cold Piping Closed Cell Foam

1. Apply insulation in thicknesses indicated. Joints shall be sealed using self-sealing seams or adhesive.
2. Fittings shall be covered with the same insulation, mitered to fit.
3. Installation - Apply insulation in the thickness indicated. Attach insulation to sheet metal duct. Joints shall be made to have compression fit with the joints sealed with adhesive. Manufacturer's installation instructions shall be followed. Adhesives and coatings shall be provided by the insulation manufacturer and shall be compatible with the insulation. Insulation shall be provided with a protective finish for outdoor use in accordance with manufacturer's recommendations.

<u>Service</u>	<u>Pipe Size</u>	<u>Insulation Thickness</u>
Refrigerant Piping	All sizes	1 – in.
Condensate Drain Piping – Air Conditioners	All sizes	1 – in.

F. Ductwork Insulation

1. For purposes of insulation, flexible ductwork shall be treated as sheet metal ductwork.
2. Provide all cold ductwork with a vapor barrier. Where the method of attachment causes penetrations of the vapor barrier, seal such penetrations with vaporseal adhesive and vapor barrier tape.
3. Clips, pins, washers, staples, and other metal components shall be of the same material as the duct to be insulated. Where items of the same material are not available, a material of equal corrosion resistance may be used. If a different material of equal corrosion resistance is to be used, it must be approved by the Engineer.
4. All outside corners of ductwork in the traffic level shall be protected by sheet metal angles. Angles shall be 22 gauge galvanized steel with 2-in legs. When the duct is constructed of materials other than galvanized steel, the protective angle shall be fabricated of the same material as the duct, or of equal corrosion resistance. If a different material of equal corrosion resistance is to be used, it must be approved by the Engineer. Angles shall be attached to the outside of the vapor barrier with adhesive. The entire inside surface of the corner angle shall be coated with adhesive before being installed.
5. All joints in insulation shall be compressed 0.25-in. Corner insulation shall be lapped with the overlap extending over the full thickness of the insulation layers. Open spaces in joints are not acceptable. A minimum of two layers of insulation shall be used when the required insulation thickness is greater than 2-in. Joints in adjacent layers shall be staggered a minimum of 3-in.
6. All ductwork, except as specifically noted below, shall be insulated unless approved in writing by the Engineer.
 - a. Exposed supply and return air ductwork located in the area it serves.

- b. Exposed ventilation exhaust and relief ductwork located in the area it serves.
- c. Exposed ventilation and relief ductwork located in areas that are neither heated nor cooled.
- d. Exposed outdoor air intake ductwork and plenums located in areas that are neither heated nor cooled.
- e. Return air ductwork located in return air ceiling spaces above the area it serves, except where the return ductwork is installed in ceiling spaces with a roof above.
- f. Toilet exhaust from toilets without showers, up to the exhaust air plenum if applicable.
- g. Toilet exhaust from toilets with showers in heated spaces, up to the exhaust air plenum if applicable.
- h. Process exhaust ductwork when the exhaust air temperature is within plus/minus 10 degrees F of the surrounding space, up to the exhaust air plenum if applicable.

G. Ductwork Insulation - Blanket Type

- 1. Concealed Round and Rectangular Single Wall Ductwork and Exposed Round Single Wall Ductwork
 - a. Installation - Apply insulation in the thickness listed below. Adhere insulation to the duct surface with adhesive applied in strips 6-in wide on 12-in centers. Butt all joints and lap jacket 2-in over adjoining jacket. Seal all lap joints with vaporseal adhesive and staples. For ducts 30-in wide and over, additionally support insulation on bottom of duct with rows of welded or adhesive clips and washers on 18-in centers. Seal penetrations, staples and terminations of vapor barrier with vapor barrier coating.
 - b. Insulation Thickness - Concealed Round and Rectangular Single Wall Ductwork and Exposed Round Single Wall Ductwork.

1) All ducts in non-conditioned spaces	2-in
2) All ducts in conditioned spaces	1-1/2-in
3) Outdoor air ducts and plenums	2-in
4) Discharge air ducts and plenums	2-in
5) Exhaust air ducts and plenums between shut-off damper and outdoors	2-in
6) Ventilation supply air ducts and plenums between shut-off damper and outdoors	2-in

H. Ductwork Insulation - Fiberglass Board Type

- 1. Exposed Rectangular Single Wall Ductwork and Plenums.

J. Installation of Ductwork

1. Fabricate and erect all ductwork as specified herein and in accordance with SMACNA requirements. Rigidly support and secure ductwork in an approved manner. Install hangers plumb and securely suspended from supplementary steel or inserts in concrete slabs. Sufficiently thread lower ends of hanger rods to allow for adequate vertical adjustment. Do not use building siding and metal decking to hang ductwork.
2. Wherever ducts are divided, maintain the cross-sectional area. All such changes must be approved and installed as directed by the Engineer or as approved on shop or erection drawings.
3. During installation, close the open ends of ducts to prevent debris and dirt from entering. Install work in accordance with the overall approved progress schedule and in cooperation with all other trades so there will be no delay to other trades.
4. Provide the unused portion of external louvers (where it is not used as a fresh air intake or exhaust) with a blank-off constructed of 0.0625-in aluminum. Provide blank-off panels with aluminum reinforcing angles to prevent buckling and secured to the exterior wall with aluminum angles and rustproof fasteners on not more than 12-in centers. Provide caulking completely around the outside edge of the angle and the aluminum.
5. Install automatic dampers when supplied by other trades.
6. Cross-break sheet metal in accordance with SMACNA duct construction standard. Apply cross-breaking to the sheet metal between the standing seams or reinforcing angles. The center of the cross-break shall be of the required height to assure each panel section being rigid.
7. Cross-break steamlined ducts on top only and adequately brace internally.
8. Beading as specified in SMACNA will be acceptable in lieu of cross-breaking.
9. Should ductwork offsets or changes in direction be made, these changes must be considered in the original bid and shall be installed at no additional cost to the Owner.
10. All necessary allowances and provisions shall be made in the installation of the ducts for the structural conditions of the building. Ducts shall be transformed or divided as may be required. Wherever this is necessary, maintain the cross-sectional area. All of these changes, however, must be approved and ducts installed as directed by the Engineer or as approved on shop or erection drawings.
11. The taper of all transformations shall be not more than 15 degrees.
12. Secure casing to curbs according to SMACNA Duct Construction Standards.
13. Provide baffle plates as required to prevent stratification and to provide proper operation of controls.
14. Where ducts are constructed of materials other than galvanized steel the reinforcing members shall be of the same material as the ductwork.

15. For PVC ductwork where reinforcing members of material other than PVC are required, totally encase the reinforcing member in PVC.
16. The use of button punching or snap locks on ductwork constructed of aluminum shall not be permitted.

K. Hangers

1. The use of wire to hang flexible ductwork shall not be permitted.
2. Ductwork shall not come in contact with any of the ceiling construction or any other equipment in the ceiling cavity.

L. Sealing of Ductwork

1. General – Unless, otherwise indicated, seal all ductwork joints and seams using sealant in accordance with the instructions of the sealant manufacturer and this Section. All transverse seams, joints and fitting connections, both shop and field assembled, shall be sealed in accordance with this Section. Not more than one longitudinal seam shall be unsealed in each section of duct.
2. Application of Sealant - Thoroughly clean all seams, joints, etc, of dirt, oil, grease, or other coatings which might interfere with the adhesion of the duct sealant before the sealant is applied.
3. Uncured sealant may be forced into the slotted side of the seam or joint before shop or field assembly, and the joint or seam completed while the sealant is still uncured. Excess sealant shall be removed from both the inside and outside of the duct before it sets.
4. Duct Tape - Use of duct tape alone for sealing ductwork is prohibited. Duct tape may be used primarily for the purpose of retaining the uncured duct sealant in seams and joints until it has cured. Duct tape shall not be applied to the inside of any duct nor shall it be applied to standing type joints at any time. All duct tape used shall be compatible with the sealant.
5. Sealant shall be either in liquid form or a mastic with a maximum flame spread of 25 and a maximum smoke developed rating of 50 when tested in accordance with ASTM E84, NFPA 255 and UL 723.
6. Sealing systems shall be suitable for the environment. The following schedule is to be used to select the sealant.
 - a. Indoor, dry galvanized round and rectangular duct is to be sealed with Iron Grip 601 or equal.
 - b. Indoor, dry, stainless steel, aluminum and PVC coated is to be sealed with FTA 20 adhesive and DT-Tape gypsum or equal.
 - c. All other areas unless otherwise noted are to be sealed with FTA 50 adhesive and DT-Tape gypsum or equal.
 - d. All sealers listed or manufactured by Hardcast Inc. and are to define the type of sealer. Other equal sealants are acceptable.

M. Ductwork Fittings and Accessory Items

1. Duct Elbows - Rectangular ductwork where full radius elbows cannot be installed, provide abrupt elbows equipped with shop-installed hollow, air foil turning vanes.
2. Flexible Connectors
 - a. Install flexible connectors at all duct connections to fans, fan units or blowers, air handling units and air conditioning units. Make connections substantially air tight at all seams and joints.
 - b. Where the construction of the flexible connection or vibration isolator results in a cross sectional area of the connection which is less than 90 percent of the adjacent ductwork, the size of the connection shall be increased to provide a cross sectional area equal to or greater than 90 percent of the adjacent duct.
 - c. Provide flexible duct connections at both the intake and discharge connections for all fans and air handling units except as noted below:
 - 1) Wall and roof fans that have integral motor/fan wheel isolation.
 - 2) Air handling units where the fan is isolated from the intake and discharge connections by internal flexible connections or separations, and the unit is mounted without vibration isolators between the unit and the support structure.
3. Dampers
 - a. Install manual volume control dampers wherever it may be necessary to regulate air volume for system air balancing.
 - b. Install splitter dampers to regulate air volume for system air balancing. Splitter dampers shall be single blade, end pivoted type, manual adjustment and position locking arrangement.
 - c. Factory-fabricated volume extractors shall be used at all supply air diffusers.
 - d. An access door, of ample size to permit maintenance and resetting of damper blades, shall be installed at each opposed blade damper, splitter damper and volume extractor so located for easy access to the damper blades.
4. Access Doors
 - a. Provide access doors at the following locations (minimum requirements):
 - 1) Automatic dampers - linkage side.
 - 2) Duct mounted temperature controllers.
 - 3) Freeze-stats.
 - 4) Fire dampers.
 - 5) Smoke dampers.

- 6) Filter banks.
 - b. Where access doors are required in ductwork located above ceilings, coordinate the location of the access doors to clear the ceiling support system and to be accessible through the ceiling grid.
5. Duct Liner - Duct liner shall be shop installed on the interior surfaces of ductwork where existing duct liner requires same. Duct liner shall meet with requirements of the NFPA Standard No. 90A for flame spread and smoke development. Duct liner shall be 1-in thick, 1-1/2-lb density, mat-faced, neoprene coated, glass fiber insulation. Installation shall be made using a single thickness of duct liner and shall be in accordance with SMACNA "Acoustical Liner." Liner shall be adhered with adhesive having a minimum of 90 percent coverage. Fasteners shall be spaced in accordance with SMACNA. After the duct has been formed the leading edges of the insulation that will be abutting another lined duct shall be spray-coated with fire-resistive adhesive. For ductwork with velocities exceeding 4000 fpm a metal nosing shall be installed at all transverse edges to secure the duct liner.
6. Blast Gates - Shall be factory fabricated of the type that completely encircles the duct in which it is mounted. After final balancing of the system, drill a hole through both the frame and gate and insert a positive locking device, such as a pop rivet, to prevent moving the gate.

N. Grilles, Registers and Diffusers

1. Install all devices in an approved manner in accordance with the manufacturer's recommendation.

O. Flexible Ductwork

1. Make connections, joints and terminations air tight as recommended by the manufacturer. Where joints are made to rigid sheet metal ductwork, apply 3M Company EC-800 sealer and the joint shall be drawn tight with a drawband. Collars shall be 2-in long minimum and sleeves shall be 4-in long minimum.
2. Install flexible ducts with one duct diameter-radius elbows and cut as short as possible. Duct shall not be compressed and the length shall be kept short so minimum hangers or supports are required, and static pressure losses are kept to a minimum. Sag in flexible duct shall not exceed 1/2-in/ft between duct supports.

P. Filling in Space Around Ductwork

1. To prevent sound passing through the area between the duct and the framed or cut opening in the floors, walls or partitions, pack mineral wool to completely fill the space the full depth of the opening. Whenever a fire-rated wall or floor is penetrated, fill the space around the duct with a locally approved type of fireproof rope.
2. At firewalls, apply galvanized sheet metal escutcheon plates on both faces of the wall to close the gap between the structure and the sides of the insulated or bare duct.

Q. Duct Supports Through Floors

1. Where vertical ducts pass through floor openings, rigidly attach supporting angles to the ducts and anchor with expansion bolts to the floor or curb. Angles shall be of the same

material as the duct for metal duct and stainless steel for non metallic ducts, placed on the two long sides of the duct extending 3-in over edge of opening, and shall not be less than the sizes recommended by SMACNA. Remaining open areas shall be filled in with a plate of the same material as the angles.

R. Supporting Outdoor Ducts

1. Provide the ducts installed above roof with angle iron supports.
2. The vertical supporting angles shall be continuous full height of the duct and shall be bolted to same. These, together with intermediate supporting angle as required, shall be provided with bottom plates which shall be welded to the vertical angles. Attach the plates with anchor bolts to sleepers, which shall be placed on scraped roofing. Weld all of these angles together to form a stiff continuous supporting unit for the duct. Paint angles with oxide primer after installation.
3. Slope ducts to shed water.
4. Duct supports shall be designed and installed to meet wind loading requirements as described in Part 2.

S. Ductwork at Masonry

1. Where ducts connect to, or terminate at masonry openings, or along the edges of floors where concrete curbs are not being provided, place a continuous 2-1/2-in by 2-1/2-in by 3/16-in galvanized angle of the same material as the duct around the ductwork. Then bolt the angle to the construction and make airtight to same by applying caulking compound on the angle before it is drawn down tight to construction.
2. Fasten plenums to concrete curbs with 3-in by 3-in by 1/4-in thick continuous angle. Concrete curbs will be provided under another Division. This angle shall sit on a continuous bead of caulking compound and be anchored to the curb at 16-in centers. Terminate the sheet metal at the curb and bolt to the angle. Seal the sheet metal to the curb with a continuous bead of caulking compound.
3. When exposed ducts pass through finished floors, walls or ceilings, provide angle collars completely covering space around duct.

T. Quality of Ductwork Installation

1. All ductwork shall be free from pulsation, chatter, vibration or objectionable noise. After system is in operation, should these defects appear, correct by removing, replacing or reinforcing the work. Sound levels shall not exceed the minimum requirement as specified in ASHRAE 1980 Systems Volume, page 35.16, Table 23. No discreet tones will be allowed.
2. The maximum allowable leakage of low pressure system shall be 5 percent of air volume.

U. Plenums

1. Seal fresh air inlet and exhaust air plenums at louvers or otherwise subject to weather entrainment watertight at all bottom joints and seams and up all vertical seams for a minimum of 12-in. After application, remove excess sealant before it sets hard. Where possible, pitch fresh air inlet and exhaust air plenums down towards the louver. Where it is

not possible to pitch the plenum, provide a 1-in capped drain connection at the low point of the plenum.

V. Test Ports

1. Where required for testing and balancing, provide instrument insertion ports. Size and location of ports shall be coordinated with the Contractor performing air balancing. Seal ports with plastic snap lock plugs. When the ductwork will be insulated, extend the port to the face of the insulation and seal the vapor barrier to the port. When the ductwork is lined, extend the port into the duct to the inner surface of the duct liner.
2. In round ductwork provide 2 ports 90 degrees on centers. In rectangular ductwork provide ports are required by AABC or NEBB for a full traverse measurement.
3. As a minimum, ports shall be provided in the following connections:
 - a. All duct mains.
 - b. All duct branches unless all connections are diffusers, registers, or grilles and the total can be calculated by summing the readings for all of the connections.
 - c. All connections to tanks or hoods where there is no other access for taking a measurement.
4. A main duct is defined as one of the following:
 - a. A duct serving five or more outlets.
 - b. A duct serving two or more branch ducts.
 - c. A duct emanating from a fan or plenum.
 - d. All remaining ducts are considered branch ducts.

W. Piping

1. Pipe and Fittings
 - a. Install piping in a neat manner with lines straight and parallel or at right angles to walls or column lines and with risers plumb. Run piping so as to avoid passing through ductwork or directly under electric light outlets and/or interference with other lines. Accomplish all work using the best methods and procedures of recognized pipe fabrication in a good and workmanlike manner in accordance with the latest revision of applicable ANSI Standards, ASME Codes and PFI Standards.
 - b. Cut pipe square, not upset, undersize or out of round. Carefully ream ends and clean before installing.
 - c. Do not remove end caps on pre-cleaned pipe until immediately before assembly. Cap all open ends immediately after completion of installation.

- d. Thoroughly clean all piping interiors after installation and keep them clean by approved temporary closures on all openings until the system is put in service. Closures shall be suitable to withstand the hydrostatic test.
2. Soldering (Copper Tubing)
- a. After cutting, thoroughly clean all surfaces to be soldered to a metal-bright finish, free from dirt, grease or other material before fluxing and soldering. Perform this cleaning by using emery cloth, sandpaper or steel wool. Clean the outside end of the tubing for a length of 1/2-in greater than the depth of the fitting. Clean the inside of the fittings in a similar manner. Apply non-corrosive flux and assemble the joint. Acid solder or acid flux will not be accepted.
 - b. Heat the surfaces to be joined slowly and uniformly to the melting point of the solder. Maintain the surface being soldered above the melting point of the solder for sufficient time to draw the solder completely into the joint. When the solder congeals to a plastic state, remove the excess metal with a cloth brush, leaving a fillet around the end of the fitting. Full penetration of the solder uniformly throughout the entire socket is required. Allow the soldered joints to cool in still air until only warm to the hand, after which the work may be quenched.
 - c. Any type of crack, pinhole, area of incomplete penetration, or similar defect will not be accepted. Peening for closing up defects shall not be permitted.
 - d. Use heating torches of sufficient size for heating of large fittings prior to soldering. Multiple tips or ring burners for use on combination torches may be used.
 - e. Remove all external and internal loose solder and flux after joint cools.
3. Refrigerant Piping
- a. Before and during silver soldering refrigerant piping, purge the assembly of pipe and fittings with dry nitrogen, to avoid formation of oxidation scale on inside of pipe during soldering.
 - b. Where specially prepared, Type R, cleaned or charged refrigerant piping is not available for equipment interconnection, with the Owner's Representative's approval, the following procedure must be completed. Clean the interior of field assembled refrigerant piping after joining in four steps as follows:
 - 1) Draw a clean lintless cloth through the piping to remove coarse dirt and dust.
 - 2) Draw clean lintless trichlorethylene saturated cloth through the piping until cloth is not discolored with dirt.
 - 3) Draw a clean cloth saturated with compressor oil through the piping.
 - 4) Complete cleaning by drawing a clean, dry, lintless cloth through the piping.
 - c. Pressure test and charge immediately after cleaning.

3.02 FIELD TESTING

A. Testing and Balancing

1. General - Test, adjust and balance all HVAC systems. If required by the Engineer, tests shall be made during the progress of the work to demonstrate the strength, durability and fitness of the installation. Furnish all instruments, ladders, lubricants, test equipment and personnel required for the tests; including manufacturer's representatives for testing and start-up of all Contractor supplied equipment. Before testing and balancing, all systems shall be cleaned as specified. Submit four copies of records of all tests, measurements, settings of throttling devices and nameplate data to the Engineer.
2. Final Tests - Perform tests of all systems as required by the Engineer prior to final acceptance of the systems for the purpose of demonstrating satisfactory functional and operating efficiency as well as adjustment. During this period, check the setting of all automatic controls and take sufficient measurements to ensure that conditions are correct and that capacities are adequate to meet the specified requirements. Systems will not be considered complete until all tests have been concluded to the satisfaction of the Engineer and all other parties having jurisdiction. In event of leakage or defects, repeat tests until all faults are corrected. Perform the general operating tests under as near design conditions as possible.
3. Perform all testing, adjusting and balancing under the supervision of a qualified heating, ventilating and air conditioning engineer employed by the air balance and testing agency. Reporting forms for testing and balancing shall be as recommended by the AABC or NEBB.
4. Coordination of the test shall be the responsibility of the balancing sub-contractor. Access to the site, availability of service representatives, and tenant acquiescence will be considered in the determination of both the testing schedule and the witnessed recheck of the balancing.
5. Refer to Section 15990 for additional requirements.

B. Piping Pressure Testing

1. Pipe Testing Procedure
 - a. The equipment to which any piping system is attached shall not be subject to any line tests. Either remove or blank off items which may be damaged by the test pressure. The test pressures apply to the piping materials as specified, but shall not be assumed to apply to piping specialties, accessories, or equipment including safety heads, rupture discs, relief valves, expansion joints, instruments or filters.
 - b. Prior to pressure testing, take the following precautions:
 - 1) Do not apply insulation over piping prior to completion of testing.
 - 2) Lines containing check valves shall have the source of test pressure located on the upstream side. Set the control valves in the open position for the duration of the test.
 - 3) Block up all piping supported by springs temporarily to a degree sufficient to sustain the test liquid load.

- c. Test the piping system at the pressure indicated in the individual pipe material specification section or 1-1/2 times normal working pressure, whichever is greater for the respective systems. Leakage or loss of head will not be acceptable.

2. Condensate Drains Testing

<u>Test Press.</u>	<u>Medium</u>	<u>Duration</u>	<u>Allowable Loss</u>
10 Feet Column	Water	2 hrs	None
10 Inch Mercury	Air	15 min.	None

3. Refrigerant Piping Testing

<u>Test Press.</u>	<u>Medium</u>	<u>Method</u>
To suit Refrigerant used	Inert gas and refrigerant	Electronic leak detector

- 4. Following the completion of acceptable leak testing, evacuate and charge the completed refrigeration system in accordance with the manufacturer's recommendations.

3.03 START-UP AND TEMPORARY OPERATION

- A. Properly maintain and service all equipment and systems until the particular equipment or the system has been accepted by the Owner.

3.04 BALANCING OF ROTATING EQUIPMENT

- A. All machines shall be balanced both statically and dynamically by the manufacturer within the limits of best commercial practices. The term machine, as used above, is to be considered as any piece of equipment, which contains rotating components. All machines furnished shall have operating speed not exceeding 80 percent of the first critical speed.

3.05 PAINTING

- A. The Contractor shall be responsible for the repair of all defects, blemishes, holidays and the like apparent in manufacturer's coatings and shall ensure that materials used for such repair shall match or be compatible with the manufacturer's standard color, coatings and practices. Do not paint over nameplates.
- B. Paint black the louver side of all louver blank off panels and the interiors of unlined plenums and ductwork where connected to louvers.

3.06 ACCEPTANCE OF AUTOMATIC CONTROL SYSTEM

- A. During the acceptance inspections, the manufacturer shall provide the required personnel to operate the system and show complete functionality. The manufacturer will also provide the required communication devices to allow simultaneous observations at multiple points. In general, each system will be run through its complete operating sequence.
- B. Systems that are found to be operating incorrectly will be bypassed and not corrected during the inspection. If multiple systems are found to not be operating, the inspection will be canceled and rescheduled at the manufacturer's expense.

3.07 CLEANING

- A. Leave all piping, ductwork and equipment in a thoroughly cleaned condition. Thoroughly flush all piping to remove all foreign materials prior to any cleaning procedure. All flushing and cleaning shall be to the satisfaction of the Engineer. Furnish, install and remove all temporary piping and equipment used in the cleaning and flushing operations.
- B. Maintain all ductwork, fans, coils, air filters, outlets and other parts of the ductwork systems in a clean condition during installation.
- C. Clean complete ductwork systems prior to testing and air balancing. Secure cheese cloth over all openings of the ductwork system for entrapment of dirt during the cleaning operation.

END OF SECTION

SECTION 15503

HVAC - DEMOLITION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Provide all labor, materials, equipment and incidentals required and remove and dispose of the HVAC systems, including ductwork, piping, insulation, controls and equipment, in the existing buildings as indicated on the Drawings and as specified herein.
- B. Provide all HVAC demolition work associated with the removal of equipment from the existing facilities, including disconnecting and removing all piping and ductwork to equipment being removed under other related Sections.
- C. Provide all work associated with the relocation of equipment for the existing and new facilities.
- D. The existing systems shall remain in service until they have been replaced by new or temporary systems.
- E. Provide documentation acceptable to the Owner of disposition of all materials removed in execution of the work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Develop a disposal plan in general compliance with the Owner's Waste Stream Management Plan as part of the design development. Include this with 35% design development documents for Owner review and comments.
- B. The existing HVAC systems, including piping, ductwork and equipment, shall remain in operation until the new or temporary systems are placed in service. All systems shall be maintained without interruption. The demolition and removal work shall be coordinated with the construction schedule for new work and the demolition work of other contracts. No demolition or removal work shall be started in any area until the asbestos removal has been completed in that area.
- B. Trace out piping systems to be relocated or removed and perform the relocation and removal work as required to provide complete and safe operating systems.
- C. Provide continuous service on all systems affected by the demolition except where Owner may permit a temporary shutdown. Where a shutdown cannot be allowed, provide temporary connections as required to maintain the services.
- D. In general, the work includes removal and disposal of:
 - 1. Ductwork, piping, insulation and equipment including their hangers, supports. Piping and ductwork shall be capped or plugged at the service indicated to remain.

2. All piping that is to be removed shall be removed back to the next live branch or main and plugged or capped.

3.02 WORK INCLUDED

A. Demolition shall include:

1. Piping, with or without insulation, hangers and terminal devices.
2. Hot and chilled water equipment, valves, insulation, pumps, boilers and chillers.
3. Air Handling Units.

3.03 DEMOLITION AND REMOVAL

- A. Remove all HVAC work associated with equipment indicated for replacement in Section 01010, Summary of Work.
- B. Remove abandoned piping, ductwork and insulation back to the source or nearest point of usage, including piping above accessible ceiling finishes and in chases.
- C. Where HVAC systems pass through demolition areas to serve other areas of the premises, they shall be maintained or suitably relocated to provide normal service.

3.04 DISPOSITION OF MATERIALS AND EQUIPMENT

- A. Except as indicated herein or otherwise directed by the Owner, all material and equipment removed under this Section shall become the property of the Contractor and shall be removed from the site and disposed of by the Contractor. Provide receipts or other documentation acceptable to the Owner verifying acceptable disposal of all legally regulated materials and equipment and other materials and equipment identified in the approved waste stream management plan required in part 3.01 of this section.

END OF SECTION

SECTION 15990

TESTING, ADJUSTING AND BALANCING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish the necessary labor, materials, instruments, transportation and devices required and test, adjust and balance the total heating-ventilating-cooling systems. Each as specified and detailed herein, or as required to produce fully operational systems. Systems to be tested, adjusted and balanced include DX packaged units and DX split systems, either with direct gas heat or with gas-fired furnaces.
- B. Testing, balancing and operation of the systems shall be performed by competent and experienced personnel, having formerly done similar work and whose qualifications and performance shall be subject to the approval of the Engineer. Test and balance systems and submit testing and balancing reports to the Engineer for review and approval. Re-balance when required by the Engineer, incorporating all changes and certify the systems have been tested and balanced to meet specified requirements.
- C. The tests shall demonstrate the specified capacities and operation of equipment and materials comprising the systems. Such tests other than as described herein, which are deemed necessary by the Engineer to indicate the fulfillment of the Contract, shall be made.
- D. When the work includes modifications to existing systems, the entire system including existing portions shall be rebalanced. Where capacities of existing components are not shown as changed, the original capacities shall be used for balancing.
- E. Data required by this Section shall receive complete approval before final payment is made.
- F. If, in the opinion of the Engineer, the Contractor has not, will not, or cannot comply with the testing, balancing and adjusting requirements of this Section, he may advise the Owner to employ a qualified firm to perform such work at Contractor's sole expense.
- G. In addition to or included in the above, the work shall include such tests as are necessary to measure and verify the electrical full load operating characteristics of all equipment replaced and/or removed in this project, and all new equipment provided by the Contractor. The purpose of such testing is to establish and document "existing conditions" prior to the project and to confirm the performance of new equipment for the Owner's use in comparing future energy savings against the savings forecast. The Engineer shall identify all such existing and new equipment to be covered by testing in the final design.

1.03 SUBMITTALS

- A. Submit the following:
 - 1. Qualifications and experience information and data as detailed under Paragraph 1.04 below.
 - 2. Proposed testing schedules and procedures.

3. Preliminary draft "system" balancing reports as systems are completed and tested.
 4. Final systems and Project balancing reports as final system adjustments are made as systems are accepted by the Owner.
 5. All submittals shall contain a statement that the specifications have been read and complied with. The certification statement shall be made by all of the following that are applicable; the Contractor, sub-contractor and the vendor. The statement shall be an individual statement for each party involved, and shall be included with every submittal and resubmittal.
- B. In general, corrections or comments or lack thereof, made relative to submittals during review shall not relieve the Contractor from compliance with the requirements of the specifications. Submittals are for review of general conformance with the design concepts of the project and general compliance with the contract documents. The Contractor is responsible for the final design conforming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating the work of all trades, and performing the work in a safe and satisfactory manner.

1.04 QUALITY ASSURANCE

- A. Qualifications standards for this work - Affiliation with manufacturers, installing contractors or engineering firms will not preclude acceptability. Submit qualifications within 60 days after Contract award, but not later than 30 days prior to the scheduled date of the start of equipment installation. Membership in the AABC or NEBB for air and water testing is required. The testing balancing contractor shall not be affiliated with the on-site contractors.
- B. The balancing contractor shall be prepared to submit credentials and other evidence of qualifications, and work experience, following receipt of, but prior to award of filed subbids.
- C. To perform required professional services, the balancing agency shall have a minimum of two test-and-balance engineers certified by the AABC or NEBB.
- D. This certified test-and-balance engineer shall be responsible for supervision and certification for the total work specified herein.
- E. The balancing agency shall submit records of experience in the field of air and hydronic system balancing or any other data as requested by the Engineer. The supervisory personnel for the firm shall have at least 5 years experience and all the employees used in this project shall be qualified technicians in this specific field.
- F. The balancing agency shall furnish all necessary calibrated instrumentation to adequately perform the specified services. An inventory of all instruments and devices in possession of the balancing agency may be required by the Engineer to determine the balancing agency's performance capability.

1.05 ENGINEERING SERVICES

- A. When engineering services are specified to be provided by the Contractor, the Contractor shall retain a licensed professional engineer to perform the services. The engineer shall be licensed at the time the work is done and in the State in which the project is located. If the State issues discipline specific licenses, the engineer shall be licensed in the applicable discipline. In addition, the engineer shall be experienced in the type of work being provided.

- B. All work is to be done according to the applicable regulations for professional engineers, to include signing, sealing and dating documents. When submittals are required by a professional engineer, in addition to state required signing and sealing, a copy of the current wallet card or wall certificate indicating the date of expiration shall be included with the submittal.

1.06 SCHEDULE AND PROCEDURES

- A. A complete schedule of balancing procedures for each of the buildings or systems shall be submitted in sufficient time in advance so that the Engineer might arrange to observe these procedures as they progress. Before commencing with the balancing of the systems submit the methods and instruments proposed to be used to adjust and balance the air and water systems.
- B. Submit proposed testing programs at least 2 weeks prior to the scheduled test to assure agreement as to personnel and instrumentation required and scope of each testing program.

1.07 DUCT SYSTEM REVIEW

- A. The balancing organization shall thoroughly review the location of all fresh air dampers, return dampers, spill dampers, quadrant dampers, splitter dampers, bypass dampers, face dampers, fire dampers, registers, grilles, diffusers, VAV boxes, troffers, etc. The purpose of the review is to finalize the optimum locations for dampers, test ports and balancing valves.

1.08 EQUIPMENT CURVES

- A. Fan Characteristics Charts: The HVAC and General Contractors shall provide to the Balancing Organization any required characteristic curve charts for all fans to include air conditioning units and air handling units. Characteristic curve charts shall be not less than 8-1/2-in by 11-in and shall show the static pressure, capacity horsepower and overall efficiency for operating conditions from no load to 130 percent of specified load. The minimum size of the actual fan curve shall be no less than 6-in by 8-in. The use of faxed copies of curves is not acceptable.
- B. Pump Characteristic Charts: The HVAC Contractor shall provide to the Balancing Organization any required characteristic curve charts for each water or water/glycol system pump. Charts shall be not less than 8-1/2-in by 11-in showing head developed, efficiency and power required for varying capacities at the operating speeds of the equipment. The minimum size of the actual pump curve shall be no less than 6-in by 8-in. The use of faxed copies of curves is not acceptable.

1.09 GUARANTEE

- A. The balancing work shall be guaranteed to be accurate and factual data, based on readings in the field. All typewritten data shall be submitted within 14 working days of the performance of the test. Test data shall not be held until final completion, but shall be submitted on an interim basis as soon as the test or appropriate groups of tests are finished.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Furnish gaskets, lubricants and other expendable materials required to be replaced during the execution of this work.

- B. Fixed-pitched pulleys required for fan adjustments shall be furnished on an exchange basis by the party responsible for the fan installation.
- C. Where test results indicate that air quantities at any system fan are below or in excess of the specified amount, the HVAC and General Contractors, at their own expense, shall change driving pulley ratio or shall make approved changes to obtain the specified or scheduled air quantities.
- D. Testing apparatus: Furnish plugs, caps, stops, valves, pumps, compressors, blowers and similar devices required to perform this work.
 - 1. Furnish anemometers, thermometers, gauges, voltmeters, ammeters, lachometers and similar instruments, not part of the permanent installation, but required to record the performance of the equipment and systems.
 - 2. Testing apparatus, not part of the permanent installation, shall remain the property of the Contractor, but made available to the Engineer.
 - 3. Instruments used for testing shall be certified accurate to within plus or minus 0.10 degrees F for temperature or plus or minus 0.10-in wc for pressure. Calibration of the instruments shall be done within 7 days of testing for this project and henceforth every 30 days thereafter for the duration of the testing period. Certification of calibration shall be submitted to the engineer prior to starting the work.

2.02 TESTING REPORTS

- A. Forms: Furnish test report data on 8-1/2-in by 11-in bond AABC or NEBB form paper. Submit format for recording data and receive approval prior to use.
- B. Reports shall be excel spread sheets format and shall be submitted in both hard copy and as a data file.
- C. The report shall contain the following general data in a format selected by the balancing agency:
 - 1. Project number
 - 2. Contract number
 - 3. Project title
 - 4. Project location
 - 5. Project architect
 - 6. Project mechanical engineer
 - 7. Test and balance agency
 - 8. Test and balance engineer
 - 9. General contractor
 - 10. Mechanical subcontractor

11. Dates tests were performed
 12. Certification
- D. At a minimum, the report shall include:
1. Preface. A general discussion of the systems, any abnormalities and problems encountered.
 2. Instrumentation list. The list of instruments including type, model, manufacturer, serial number and calibration dates.
 3. System Identification. In each report, the VAV boxes, zones, supply, return and exhaust openings and traverse points shall be numbered and/or lettered to correspond to the numbers and letters used on the report data sheets and on the report diagrams.
- E. Prepare 11-in by 17-in single line diagrams or 12-in by 18-in half size drawings showing all duct systems indicating all terminal air outlets including diffusers, grilles and registers, perforated plates, nozzles and other types of air supply, exhaust or return outlets. The minimum scale for diagrams showing the measurement points shall be 1/8-in=1-ft-0-in in the final form as submitted. The use of faxed copies of diagrams is not acceptable. Location of test points shown on the diagrams shall be clear and easy to locate on the diagram. The identification mark of the test points shall be the same as is shown on the test report showing the test data. The identification for test points shall include indication of the units served, and shall not have a duplicate in the project. All supply outlets shall be adjusted so that there are no drafts. Grille and register readings may be made by a vane anemometer, but diffuser readings shall be made by a flow hood or a velometer, using the tip recommended by the diffuser manufacturer. Each test sheet shall include the following data:
1. Job name and address.
 2. Name of HVAC Contractor.
 3. Name of balancing organization.
 4. Instruments used to perform the test.
 5. Name of test technician or test engineer.
 6. Fan system and/or zone number.
 7. Room number or area name.
 8. Size of outlet.
 9. Type outlet.
 10. Manufacturer of outlet.
 11. The cfm at each outlet on system and corresponding cfm at each outlet as noted on the plans.
 12. Percent deviation of the measured flow versus the design flow.

13. Indication of the branch and terminal that are the open/low that are the basis for balancing the remainder of the system

PART 3 EXECUTION

3.01 INSPECTIONS

- A. During construction, the balancing agency shall inspect the installation of pipe systems, sheet metal work, temperature controls, and other component parts of the heating, ventilating and air conditioning systems. The inspections shall be performed periodically as the work progresses. A minimum of two inspections are required as follows: (1) when 60 percent of the piping connections are made; (2) when 90 percent of the equipment is fully installed. The balancing agency shall submit a brief written report of each inspection to the Engineer.

3.02 START OF BALANCING

- A. The General Contractor shall notify the Balancing Organization and Engineer when systems become operational and ready for preliminary and final testing, adjusting and balancing.
- B. Final balancing shall not begin until system has been installed complete and is capable of normal operation. Provide personnel to assist in rough balance and calibration.
- C. All grilles, dampers, fans, coils, pumps, valves and linkages shall be verified to be installed and operating.
- D. System shall be capable of operating under control as specified herein.
- E. Visually inspect all fire dampers on branch take-offs to each floor to ensure that they are fully open.
- F. Verify with straight edge that fan/pump and motor shafts are parallel and that sheaves are in proper alignment.
- G. Verify that belts are properly tensioned when unit is operating with no excessive squeal at startup. If not correct, adjust sheaves or motor base accordingly.
- H. Start fans and pumps, verify that rotation is correct. If rotation is incorrect coordinate with electrical contractor to switch power leads such that the motor rotates correctly.
- I. Check nameplate voltage on motor, compare to scheduled voltage. Notify the Engineer immediately of any discrepancies. Measure and record actual voltage across all power leads. Notify the Engineer of discrepancies immediately.
- J. Check motor nameplates full load amps, measure and record amperage across all power leads. If there are marked discrepancies in amperage draws between legs, notify the Engineer immediately.
- K. Measure and record fan/pump and motor rpm. Check that motor rpm agrees with nameplate and scheduled rpm.

- L. If, upon commencing the work, the balancing contractor finds that the systems are not ready, or if a dispute occurs as to the readiness of the systems, the balancing agency shall request an inspection to be made by the Engineer. This inspection shall establish to the satisfaction of the represented parties whether or not the systems meet the basic requirements for testing and balancing. Should the inspection reveal the notification to have been premature, all costs for the inspection and work previously accomplished by the balancing agency shall be paid for by the General Contractor. Furthermore, such items that are not ready for testing and balancing shall be completed and placed in operational readiness before testing and balancing services shall be recommenced.
- M. Leaks, damage and defects discovered or resulting from startup, testing and balancing shall be repaired or replaced to like-new condition with acceptable materials. Tests shall be continued until system operates without adjustments or repairs.

3.03 REQUIRED ACCURACY

- A. Systems shall be balanced to be within the following limits of the capacity of each system as sized through the Contractor's calculations. Limits shall be applied to both individual components and to the system totals.
 - 1. General Systems (plus/minus 10 percent)

3.04 TESTING

- A. HVAC Air Systems
 - 1. Balance the supply return and exhaust air systems in accordance with AABC or NEBB Standards by the use of direct reading instruments such as an "anemotherm" or velometer which has been properly calibrated.
 - 2. Temporarily add static pressure to the system, to simulate the effect of dirty filters, by blanking off portions of the filter section, covering filter section with cheesecloth or other suitable means. Confirm static has been added with new static pressure reading across fan. Remove cheesecloth, etc, after traverses are complete.
 - 3. If so instructed by the Engineer, further balancing of temperature shall be made either by thermometer or by temperature recorder.
 - 4. The sequence of air balancing shall be as follows:
 - a. First, establish air flow quantity at supply fan by main duct traverse.
 - b. Next, establish air flow quantities in main ducts and branches.
 - c. Finally, establish air flow quantities at outlets, using proportional balancing among branch outlets. All multiple opening systems shall be left with at least one "open low" inlet or outlet, to which all other system openings shall be proportionally balanced. The "open low(s)" on each system shall be indicated in the report.
 - d. After all outlets are adjusted to within the tolerances specified elsewhere in this Section, remeasure all system outlets, and retrace all branch and main ducts to establish final "as balanced" flows.

- e. All main air ducts shall be traversed, using a Pitot tube and manometer. The manometer shall be calibrated to read two significant figures in all velocity pressure ranges. The static pressure reading at the traverse point shall be recorded for each successive traverse.
 - 1) A main duct is defined as either of the following:
 - a) A duct serving five or more outlets.
 - b) A duct serving two or more branch ducts.
 - c) A duct emanating from a fan or plenum.
 - 2) All other ducts are branch ducts.
 - 3) The intent of this operation is to measure by traverse, the total air quantity handled by the fan and to verify the distribution of air to zones and to adjust system pressure to minimum level required to satisfy the farthest air outlet.
 - f. Adjust fan speeds if results of system capacity tests are not within tolerances specified and repeat Paragraphs 3.04A4c, d and e above, as required.
 - g. Mark all final balancing damper positions with a permanent marker.
 - h. For systems which modulate between different flow modes (e.g. minimum outside air to 100 percent outdoor air or 100 percent return air to 100 percent exhaust) measure and report system flow under both extremes of modulation and check for excessive system flow deviation above design, when system is modulating between its end points.
5. Furnish data in excel spread sheet format tabulating the following:
- a. Opening number, type, size and design flow rate.
 - b. Quantity of air in cfm at each air outlet and inlet.
 - c. Dry bulb temperature in each room.
 - d. Dry bulb temperature of the supply air.
 - e. Outdoor dry and wet bulb temperature at the time the above tests are conducted. (Wet bulb temperature only required for AC systems)
6. Adjust belts, sheaves and the alignment of air handling equipment.
7. Where various combinations of sheaves must be installed on fan systems to achieve the correct air delivery, change the sheaves and continue to take successive readings until the correct combinations are installed.

8. Furnish data in excel spread sheet format taken at each air moving device, to include fans, packaged units and air handling units, tabulating the following:
 - a. Manufacturers, model number and serial number of units.
 - b. All design and manufacturer's rated data.
 - c. Total quantity of supply air in cfm.
 - d. Total quantity of return air in cfm.
 - e. Total quantity of exhaust or relief air in cfm.
 - f. Total quantity of outside air in cfm.
 - g. Outlet velocity - fpm.
 - h. The rpm of each fan or blower.
 - i. Maximum tip speed - fpm.
 - j. The rpm of each motor.
 - k. Voltage and ampere input of each motor (one reading for each phase leg on 3 phase motors).
 - l. Pressure in inches w.g. at inlet of each fan or blower.
 - m. Pressure in inches w.g. at discharge of each fan or blower.
 - n. Pressure drops across system components such as louvers, filters, coils and mixing boxes.
 - o. Submit the actual fan operating point on a copy of the fan shop drawing showing operating curve.
 - p. List the following data from all fan motors installed.
 - 1) Manufacturer model and size.
 - 2) Motor horsepower, service factor and rpm.
 - 3) Volts, phases, cycles and full load amps.
 - 4) Equipment locations.
9. Systems with variable volume boxes and constant volume boxes furnish the following, with ATC contractor present for necessary coordination:
 - a. At static pressure probe location measure static pressure with manometer and compare with reading registering at system panel or readout receptacle. The "most critical" volume

box shall be determined by the Engineer from approved sheet metal shop drawing submittals. Observe damper linkage, at this box, instruct ATC contractor to vary static pressure setpoint as required so that with thermostat calling for full cooling, the most critical box damper is 75 percent open. (Score line on damper linkage and mark full open and closed positions of box damper. Using protractor mark 75 percent open position on volume box.)

- b. At each series fan powered variable volume box, confirm that thermostat and box controller are of the same type (i.e., direct acting or reverse acting).
- c. At each constant volume box, use magnehelic gauge to adjust setpoint of box controller to differential pressure corresponding to velocity (airflow) specified. Confirm diffuser totals agree with results.

B. HVAC Water Coils

1. Furnish data in excel spread sheet format tabulating the following:
 - a. Manufacturer and model number of all units.
 - b. All design and manufacturers rated data.
 - c. Entering and leaving fluid temperatures.
 - d. Quantity of air in cfm.
 - e. Face velocity in fpm.
 - f. Dry and wet bulb air temperature entering and leaving coil. Wet bulb temperature not required for heating coils.
 - g. Capacity of coil in BTUH.
 - h. Quantity of fluid circulated through coil in gpm.
 - i. Fluid pressure drop in psig.

C. Refrigeration Machines

1. Furnish data in excel spread sheet format tabulating as follows:
 - a. Manufacturer, model number, size and serial number of all units.
 - b. All design and manufacturer's rated data.
 - c. Suction and condensing temperatures, and pressures.
 - d. Temperatures of entering and leaving chilled and condenser water.
 - e. Voltage and ampere input of motors under full load (one for each phase leg).
 - f. Capacity of machine in Btuh.

- g. Quantity of chilled and condenser water circulated through machine in gpm.
- h. Fluid pressure drops in psig.

D. Pumps

1. Furnish data in excel spread sheet format tabulating the following:
 - a. Manufacturer, model number, size and serial number of all units.
 - b. All design and manufacturer's rated data.
 - c. Quantity of fluid circulated by each pump in gpm.
 - d. Suction and discharge pressures across each pump in psig or feet of head.
 - e. Voltage and ampere input of each motor (one reading for each phase leg on three phase motors).
 - f. Percent efficiency of each pump.
 - g. Horizontal, vertical and angular misalignment of pump and driver after two hours operation and after remaining idle overnight.
 - h. Submit actual pump performance point on a copy of the pump shop drawing operating curve.

E. Heat Exchangers and Water Cooled Condensers

1. Furnish data in excel spread sheet format tabulating the following at full flow for design and actual:
 - a. Manufacturer, model number, size and serial number of all units.
 - b. All design and manufacturer's rated data.
 - c. Shell side pressure drop.
 - d. Shell side gpm.
 - e. Shell side temperature differential.
 - f. Tube side pressure drop.
 - g. Tube side gpm.
 - h. Tube side temperature differential.
 - i. Relief valve setting.

F. Heating Hot Water Boilers

1. Furnish data in excel spread sheet format tabulating as follows:
 - a. Manufacturer, model number, size and serial number of all units.
 - b. All design and manufacturer's rated data.
 - c. Temperatures of entering and leaving hot water.
 - d. Voltage and ampere input of motors under full load (one for each phase leg).
 - e. Capacity of machine in Btuh.
 - f. Quantity of hot water circulated through the boiler in gpm.
 - g. Hot water pressure drops in psig.

3.05 STANDBY EQUIPMENT

- A. Where systems are provided with standby equipment, the system shall be balanced for operation in standby as well as normal operation.

3.06 FINAL ACCEPTANCE

- A. At the time of final inspection, the balancing agency shall recheck, in the presence of the Engineer, specific and random selections of data recorded in the certified test-and-balance report.
- B. Points and areas for recheck shall be selected by the Engineer.
- C. Measurements and test procedures shall be the same as the original test and balance.
- D. Selections for recheck, specific plus random, shall not normally exceed 15 percent of the total number tabulated in the report, except where special air systems require a complete recheck for safety reasons.
- E. If the specific rechecks are more than 5 percent deviation from the report or specified flows, all of the systems, that require specific recheck, shall be rebalanced. If 5 percent or 5 of the random checks, whichever is less, exceeds a 10 percent deviation from the specified flows, the report shall be rejected. In the event the report is rejected, all systems shall be readjusted and tested, new data recorded, a new certified test-and-balance report submitted, and a new inspection test made, all at no additional cost to the Owner.

3.07 OPPOSITE SEASON TEST

- A. The balancing agency shall perform an inspection of the HVAC system during the opposite season from that in which the initial adjustments were made. The balancing agency shall make any necessary modifications to the initial adjustments to produce optimum system operation.

END OF SECTION

SECTION 16000

ELECTRICAL - GENERAL PROVISIONS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials and equipment required and install complete and make operational, electrical systems as specified herein.
- B. The work shall include furnishing, installing and testing the equipment and materials detailed in the following Sections:

<u>Section No</u>	<u>Title</u>
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16000	- Electrical - General Provisions
16110	- Raceways, Boxes, Fittings and Supports
16120	- Wires and Cables

- C. The work shall include the following:
 - 1. Provide conduit, wire and field connections for all new electrical equipment furnished under Divisions 16.
 - 2. Provide power wiring for all heating, ventilating, and air conditioning equipment furnished under other related Divisions, including power wiring for thermostats. Refer to HVAC Specifications.
 - 3. Coordinate the sequence of demolition with the sequence of construction to maintain building operation. Remove and demolish equipment and materials in such a sequence that the existing building will function properly with no disruption of operation.
- D. Each bidder or their authorized representatives shall, before preparing their proposal, visit all areas of the existing buildings and structures in which work under this sub-bid is to be performed and inspect carefully the present installation. The submission of the proposal by this bidder shall be considered evidence that their representative has visited the buildings and structures and noted the locations and conditions under which the work will be performed and that he/she takes full responsibility for a complete knowledge of all factors governing his/her work.
- E. Provide electrical demolition work associated with the removal of equipment from the existing facilities in accordance with Owner's Waste Stream Management Plan.
- F. Sequencing and Scheduling
 - 1. Coordinate electrical equipment installation with other trades.
 - 2. Sequence, coordinate and integrate the installation of electrical materials and equipment for efficient flow of the work.
 - 3. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.

1.02 RELATED WORK

- A. All automatic temperature control wiring for heating, ventilating and air conditioning equipment will be furnished and installed under Division 15.

1.03 SUBMITTALS

- A. Submit shop drawings for equipment, materials and other items furnished under Division 16.
- B. As a minimum all equipment specified in each Section of Division 16 shall be submitted at one time. As an example all lighting fixtures shall be submitted together. Submittals that do not comply will be returned disapproved.
- C. Shop drawings shall be submitted for the following equipment:
 - 1. Wires and Cables
 - 2. Raceways, Boxes, Fittings and Hangers
- D. The manufacturers name and product designation or catalog numbers shall be submitted for the following material:
 - 1. Raceways, Boxes, Fittings and Hangers
 - 2. Wire and Cable
- E. Mark submittals to clearly identify proposed equipment including accessories, options, and features and to exclude parts not applicable to the project. When manufacturer's cut sheets apply to a product series rather than a specific product, the data specifically applicable to the project shall be highlighted or clearly indicated by other means. Each submittal piece of literature and each submittal drawing shall clearly reference the Project Specification and/or Contractor's Drawing that the submittal is to cover. General catalogs will not be accepted as cut sheets to fulfill submittal requirements.
- F. Check shop drawings for accuracy prior to submittal. Shop drawings shall be stamped with the date checked and a statement indicating that the shop drawings conform to this Section and the Contractor's Drawings. This statement shall also list all exceptions to this Section and the Contractor's Drawings. Mark submittals to identify proposed equipment including accessories, options and features being proposed for approval and exclude parts not to be used. Shop drawings not so checked and noted shall be returned marked NOT APPROVED.
- G. The Engineer's check shall be for conformance with the design concept of the project and compliance with this Section and the Contractor's Drawings. Errors and omissions on approved shop drawings shall not relieve the Contractor from the responsibility of providing materials and workmanship required by this Section.
- H. All dimensions shall be field verified at the job site and coordinated with the work of all other trades.
- I. Material shall not be ordered or shipped until the shop drawings have been approved. No material shall be ordered or shop work started if shop drawings are marked "APPROVED AS NOTED - CONFIRM," "APPROVED AS NOTED - RESUBMIT" or "NOT APPROVED."

J. Operation and Maintenance Data

1. Submit operations and maintenance data for equipment furnished under this Division, in accordance with Section 01730. The manuals shall be prepared specifically for this installation and shall include catalog data sheets, drawings, equipment lists, descriptions, parts lists including replacement part numbers, to instruct operating and maintenance personnel unfamiliar with such equipment.
2. Manuals shall include the following as a minimum:
 - a. A comprehensive index.
 - b. A complete "As-Built" set of approved shop drawings.
 - c. A complete list of the equipment supplied, including serial numbers, ranges and pertinent data.
 - d. System schematic drawings "As-Built," illustrating all components, piping and electric connections of the systems supplied under this Section.
 - e. Complete parts list with stock numbers, including spare parts.

K. **Exceptions for Submittals**

1. Exceptions to the Specifications shall be clearly defined by the Electrical Subcontractor in a separate section of each submittal package. The submittal shall contain the reason for the exception, the exact nature of the exception and the proposed substitution so that a proper evaluation may be made by the Engineer. The acceptability of any device or methodology submitted as an "or equal" or "exception" to the Specifications shall be at the sole discretion of the Engineer.
 - a. By noting the term "compliance", it shall be understood that the manufacturer is in full compliance with the item specified and will provide exactly the same with no deviations.
 - b. By noting the term "deviation", it shall be understood that the manufacturer prefers to provide a different component in lieu of the one specified and in so doing, takes full responsibility for making the equipment work as specified and will provide any and all ancillary components to make the equipment work at no extra cost to the Owner.
 - c. By noting the term "alternate", it shall be understood that the manufacturer proposes to provide the same operating function but prefers to do it in a different manner and in so doing, takes full responsibility for making the equipment work as specified and will provide any and all ancillary components to make the equipment work at no extra cost to the Owner. The alternate method shall be fully described with schematic diagrams and one-line diagrams as applicable.

1.04 REFERENCE STANDARDS

- A. Electric equipment, materials and installation shall comply with the National Electrical Code (NEC) and with the latest edition of the following codes and standards:
1. National Electrical Safety Code (NESC)
 2. Occupational Safety and Health Administration (OSHA)
 3. National Fire Protection Association (NFPA)
 4. National Electrical Manufacturers Association (NEMA)
 5. American National Standards Institute (ANSI)
 6. Insulated Cable Engineers Association (ICEA)
 7. The Instrumentation, Systems and Automation Society (ISA)
 8. Underwriters Laboratories (UL)
 9. Factory Mutual (FM)
 10. International Electrical Testing Association (NETA)
 11. State of Georgia Building Codes
 12. Cobb County, Georgia, Code of Ordinances
 13. The Building Officials and Code Administrators National Building Code (BOCA)
 14. American Society for Testing and Materials (ASTM)
 15. Institute of Electrical and Electronics Engineers (IEEE)
 16. Joint Industrial Council (JIC)
- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 PRIORITY OF THE CONTRACT DOCUMENTS

- A. If, during the performance of the work, the Contractor finds a conflict, error or discrepancy between or among one or more of the Sections, furnish the higher performance requirements. The higher performance requirement shall be considered the equipment, material, device or installation method which represents the most stringent option, the highest quality or the largest quantity.
- B. In all cases, figured dimensions shall govern over scaled dimensions, but work not dimensioned shall be as directed by the Engineer and work not particularly shown, identified, sized, or located shall be the same as similar work that is shown or specified.
- C. If the issue of priority is due to a conflict or discrepancy between the provisions of the Contract Documents and any referenced standard, or code of any technical society, organization or

association, the provisions of the Contract Documents will take precedence if they are more stringent or presumptively cause a higher level of performance. If there is any conflict or discrepancy between standard specifications, or codes of any technical society, organization or association, or between Laws and Regulations, the higher performance requirement shall be binding on the Contractor, unless otherwise directed by the Engineer.

- D. In accordance with the intent of the Contract Documents, the Contractor accepts the fact that compliance with the priority order specified shall not justify an increase in Contract Price or an extension in Contract Time nor limit in any way, the Contractor's responsibility to comply with all Laws and Regulations at all times

1.06 ENCLOSURE TYPES

- A. Unless otherwise required, electrical enclosures shall be NEMA Types as follows:
 - 1. NEMA 1 in dry, non-process indoor above grade locations (i.e. administration areas, laboratories, control rooms, storage rooms).
 - 2. NEMA 12 in "DAMP" locations.
 - 3. NEMA 4 in outdoor locations, rooms below grade including basements, buried vaults and "WET" locations.

1.07 CODES, INSPECTION AND FEES

- A. Equipment, materials and installation shall comply with the requirements of the local authority having jurisdiction.
- B. Obtain all necessary permits and pay all fees required for permits and inspections.

1.08 RECORD DRAWINGS

- A. As the work progresses, legibly record all field changes on a set of Project Contract Drawings, hereinafter called the "Record Drawings."
- B. Record Drawings shall accurately show the newly installed condition of the following items:
 - 1. Control Wiring Diagram(s).
 - 2. Point to point connection diagrams:
 - a. Provide detailed point-to-point interconnection wiring diagrams for all equipment furnished under Divisions 15 and 16 requiring an electrical connection; either control, signal, or power, as indicated. All communication system wiring shall be included.
 - b. Point-to-point connection diagrams shall be produced with AutoCad 2004 software. A separate drawing shall be provided for each diagram. One complete diagram shall be included on a drawing.
 - c. Submit samples of the point-to-point (PTP) interconnection diagrams to the Owner for approval at the beginning of the construction phase. The sample drawings shall indicate the drawing format, equipment and device labeling and wire tagging methodology to be used for all diagrams. The diagrams shall include the following information:

- d. Circuit origin, destination and wire numbers.
- e. Field wiring terminal strip names and numbers.
- f. Each point-to-point interconnection diagram shall be unique with diagram number, wire numbers, device numbers, equipment numbers and location designations.
- g. The sample diagrams shall include:
 - 1) A motor and remote device(s) connection to a motor control center or motor starter.
 - 2) Connections between a variable frequency drive, motor, remote control devices, remote control panels, PLC Panels and RTU.
- h. Submit detailed PTP connection diagrams for each system. The diagram shall show all components of the circuit both analog, digital, and discrete, including all relays, switches, and starters which are being provided for proper operation. Pneumonic designations used shall correspond to the loop numbers. The format shall be the Instrument Society of America, Standard for Instrument Loop Diagrams, ISA-S5.4 plus the following requirements:
 - 1) Show all interconnecting wiring between equipment, panels, terminal junction boxes and field mounted components. The diagrams shall show all components and panel terminal board identification numbers and all wire numbers. This diagram shall include all intermediate terminations between field elements and panels (e.g. terminal junction boxes). The diagrams shall be coordinated with the work to be performed under Divisions 11, 13, 15 and 16.
 - 2) Show locations of all devices.
 - 3) Show all power back to termination on terminal block or panel board, including circuit breaker size, as applicable.
 - 4) Show all grounding points with cabinets and panels and identify the connection point of individual components.
 - 5) Each PTP connection diagram shall be submitted on a 24-in by 36-in sized sheet with all the information needed for installation, checkout, startup and maintenance. Each diagram shall contain the following information:
 - a) All devices or items with clear labeling and identification.
 - b) Word descriptions of circuit functions. The title should be adequate, but if not, a supplemental note shall be added. A description of special features or functions which are not obvious or implied in the title, especially safety and shutdown circuits, is required. The identification of safety and shutdown circuits is especially important.
 - c) All interconnections with identifying numbers for electrical cables and conductor pairs. This identification of connections includes junction boxes,

computer input/output (I/O) connections, grounding system and grounding connections.

- d) Locations of devices, such as, but not limited to: field, panels, auxiliary equipment, termination cabinets, local control panels, switchgear, motor control centers, and panel boards.
 - e) Electrical power supply requirements designation voltage and other applicable requirements.
 - f) Identifying numbers for equipment, including devices, panels, terminal boxes, junction boxes, motor control centers, switchgear and panel boards
 - g) The PTP connection diagrams shall be produced on bond paper (24-in by 36-in) with 1/8-in letter size which can be reduced to (half size) for field use and still be legible.
 - h) Each PTP connection diagram shall contain only one circuit or loop. Care must be used to prevent overcrowding and space left for future additions and circuit data.
 - i) A consistent pattern (horizontal or vertical) shall be developed for presentation. The drawing shall be divided into section for relative location of devices.
 - j) The symbols in ANSI Y32.20 (ISA S5.1) are suitable for instrumentation devices. However, these symbols shall be expanded to include connection points and power sources to clarify certain connection and operation details required on the diagrams.
- i. Provide Wire, Equipment and System Schedules:
- 1) Wire Schedules shall be sorted in list format with the following priorities:
 - a) Wire ID Number
 - b) Equipment ID where wire is terminated
 - c) Termination point ID
 - 2) Equipment Schedule shall be sorted in page format. Each page shall include the Equipment tag number, the interconnection diagram on which it is indicated and wire ID numbers immediately below its respective Interconnection Diagram. Adjacent to the wire numbers shall be the termination equipment and terminals trip IDS and the respective shop drawing on which they are indicated. The sort shall have the following priorities, each page shall be arranged with:
 - a) Equipment tag number
 - b) Interconnection diagram number
 - c) Wire ID Number

3) System Schedule shall be sorted with the following priorities:

- a) System Code
 - b) Equipment tag number
 - c) Interconnection diagram
- C. Submit the record drawings and the schedule of control wiring raceways and wire numbers (or the point-to-point connection diagram) to the Owner.

1.09 EQUIPMENT INTERCONNECTIONS

- A. Review shop drawings of equipment furnished under Divisions 15 and 16 and prepare coordinated wiring interconnection diagrams. Submit copies of wiring diagrams or tables with Record Drawings.
- B. Furnish and install all equipment interconnections.

1.10 MATERIALS AND EQUIPMENT

- A. Materials and equipment furnished under this contract shall be new.
- B. Material and equipment of the same type shall be the product of one manufacturer and shall be UL listed.
- C. Warrant all equipment furnished under Division 16 in accordance with Section 01740. Refer to individual equipment sections for additional warranty items.

1.11 EQUIPMENT IDENTIFICATION

- A. Identify equipment, furnished under Division 16 with the name of the equipment it serves.
- B. Nameplates shall be engraved, laminated plastic, not less than 1/16-in thick by 3/4-in by 2-1/2-in with 3/16-in high white letters on a black background.

1.12 DEMOLITION

- A. Survey the existing electrical systems and equipment identified for removal with the Owner and with representatives from the other trades prior to performing any demolition work. Identify all conduit and equipment to be removed with tags or paint.
- B. Where a piece of equipment is to be removed all associated ancillary components and associated wiring and conduit shall also be removed.
- C. Equipment scheduled to be turned over to the Owner shall be carefully disconnected, removed and delivered to the Owner. Provide labor, hoisting and transportation of the equipment. All other miscellaneous electrical materials, devices, etc, associated with the equipment being turned over shall be demolished and removed from the site.
- D. Remove electrical work associated with equipment scheduled for demolition except those portions indicated to remain or be reused.

- E. Unless otherwise specifically noted, remove unused exposed conduit and support systems back to point of concealment including abandoned conduit above accessible ceiling finishes. Remove unused wiring back to source (or nearest point of usage).
- F. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned or being removed. Provide blank covers for abandoned outlets which are not removed.
- G. Disconnect and remove abandoned panelboards, disconnect switches, control stations, distribution equipment, etc.
- H. Repair adjacent construction and finishes damaged during demolition and extension work.
- I. Where electrical systems pass through the demolition areas to serve other portions of the premises, they shall remain or be suitably relocated and the system restored to normal operation.
- J. Coordinate electrical power outages to the electrical systems and equipment with the Owner. Where duration of proposed outage cannot be allowed by the Owner, phase the retrofit work to allow the system or equipment to be re-connected to the electrical power system within the time frame allowed by the Owner or provide temporary power connections as required to maintain service to the systems or equipment. The temporary power can be from a generator or another part of the facility not affected by the outage provided there is sufficient spare capacity.
- K. Continuous service is required on all circuits and outlets affected by these changes, except where the Owner will permit an outage for a specific time. Obtain Owner's consent before removing any circuit from continuous service.
- L. Trace out existing wiring that is to be relocated, or removed and perform the relocation or removal work as required for a complete operating and safe system.
- M. Remove exposed conduits, wireways, outlet boxes, pull boxes and hangers made obsolete by the alterations, unless specifically designated to remain. Patch surfaces and provide blank covers for abandoned outlets which are removed.
- N. All equipment, materials, wiring, raceways, etc, furnished and installed to temporarily keep circuits energized shall be removed when the permanent installation is fully operational.

1.13 DISPOSITION OF REMOVED MATERIALS AND EQUIPMENT

- A. It is intended that material and equipment indicated to be removed and disposed of by the Contractor shall, upon removal, become the Contractor's property and shall be disposed of off the site by the Contractor in accordance with the Owner's Waste Stream Management Plan, unless otherwise directed by the Owner. A receipt showing acceptable disposal of any legally regulated materials or equipment shall be given to the Owner.
- B. PCBs, mercury and PCB/mercury contaminated equipment shall be removed, packaged, shipped and disposed of in accordance with all State and Federal regulations. Obtain the services of a firm licensed and regularly engaged in the removal of PCBs and PCB contaminated equipment. The firm shall be licensed in the State or States in which the contaminated material is handled, shipped and disposed. Pay all fees associated with the removal of the contaminated material and equipment and provide documentation showing acceptable disposal.

- C. Should the Contractor discover PCB or mercury contaminated equipment that was not identified; they shall cease work on or about the equipment and notify the Engineer immediately. The Contractor shall then proceed with the work as directed by the Engineer.

1.14 PROFESSIONAL ENGINEERING SERVICES

- A. When engineering services are specified to be provided by the Contractor, the Contractor shall retain a licensed professional engineer to perform the services. The engineer shall be licensed at the time the work is done and licensed in the State of Georgia. If the State issues discipline specific licenses, the engineer shall be licensed in the applicable discipline. In addition, the engineer shall be experienced in the type of work being provided.
- B. All engineering work shall be done according to the applicable regulations for professional engineers to include signing, sealing and dating documents. When submittals are required by a professional engineer, in addition to state required signing and sealing, a copy of the current wallet card or wall certificate indicating the date of expiration shall be included with the submittal.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CUTTING AND PATCHING

- A. Cutting and patching shall be done in a thoroughly workmanlike manner and be in compliance with modifications and repair to concrete as specified in Section 01045. Saw cut concrete and masonry prior to breaking out sections.
- B. Core drill holes in concrete floors and walls as required.
- C. Install work at such time as to require the minimum amount of cutting and patching.
- D. Do not cut joists, beams, girders, columns or any other structural members.
- E. Cut opening only large enough to allow easy installation of the conduit.
- F. Patching to be of the same kind and quality of material as was removed.
- G. The completed patching work shall restore the surface to its original appearance or better.
- H. Patching of waterproofed surfaces shall render the area of the patching completely waterproofed.
- I. Remove rubble and excess patching materials from the premises.
- J. When existing conduits are cut at the floor line of wall line, they shall be filled with grout of suitable patching material.

3.02 INSTALLATION

- A. Work not installed according to the specifications shall be subject to change as directed by the Engineer at Contractor's expense.

- B. Electrical equipment shall be protected against mechanical and water damage. Store all electrical equipment in dry permanent shelters.

END OF SECTION

SECTION 16110

RACEWAYS, BOXES, FITTINGS AND SUPPORTS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install complete raceway systems as specified herein.

1.02 SUBMITTALS

- A. Submit to the Engineer the manufacturers' names and product designation or catalog numbers with cut-sheets of all materials specified. Indicate in the submittal, the areas where specific materials are used.

PART 2 PRODUCTS

2.01 MATERIALS

A. Rigid Aluminum Conduit

1. Rigid aluminum conduit shall be 6063 alloy and shall be as manufactured by New Jersey Aluminum Corp.; Reynolds Aluminum International Services Inc.; Alumax Extrusions, Inc; VAW of America, Inc. or equal.
2. Rigid aluminum conduit shall be for use under the provisions of NEC Article 344.

B. Electrical Metallic Tubing

1. Electrical metallic tubing shall be hot-dipped galvanized steel as manufactured by the Allied Tube and Conduit Corp.; Triangle PWC Inc.; Wheatland Tube Co.; Bridgeport or equal.
2. Electrical metallic tubing shall be for use under the provisions of NEC Article 358.

C. Flexible Metallic Tubing

1. Flexible metallic tubing shall be for use under the provisions of NEC Article 360.
2. Flexible metallic tubing shall be hot-dipped galvanized steel strips shaped into interlocking convolutions firmly joined to one another assuring a complete lock similar to Tristeel as manufactured by Triangle - PWC, Inc. or equal.
3. Flexible metallic tubing shall be used only indoors for connection to lighting fixtures in administration areas, office areas and above acoustical ceilings..
4. Furnish and install insulated bushings at terminations for conductor protection.

D. Flexible Couplings

1. Flexible couplings shall be type ECGJH as manufactured by the Crouse-Hinds Co.; Appleton Electric Co.; Killark Electric Manufacturing Co. or equal.

E. Boxes and Fittings

1. Pressed steel switch and outlet boxes shall be hot-dipped galvanized with hot-dipped galvanized tile rings as manufactured by the Raco Manufacturing Co.; Adalet Co.; O.Z. Manufacturing Co. or equal.
2. NEMA 1 and NEMA 12, junction boxes, pull boxes etc., shall be sheet steel. Boxes shall be galvanized and have continuously welded seams. Welds shall be ground smooth and galvanized. Box bodies shall be flanged and shall not have holes or knockouts. Box bodies shall not be less than 14 gauge metal and covers shall not be less than 12 gauge metal. Covers shall be gasketed and fastened with stainless steel screws. Terminal boxes shall be furnished with hinged doors, terminal mounting straps and brackets. Boxes shall be as manufactured by Hoffman Engineering Co.; Lee Products Co.; ASCO Electrical Products Co., Inc., or equal. All boxes shall be shop primed and painted by the box manufacturer.
3. Cast aluminum boxes and fittings shall be copper free aluminum with cast aluminum covers and stainless steel screws as manufactured by the Killark Electric Co.; Crouse-Hinds Co.; Appleton Electric Co.; or equal.
4. Cast aluminum device boxes shall be Type FD. All cast aluminum boxes and fittings shall be copper-free aluminum with cast aluminum covers and stainless steel screws as manufactured by the Killark Electric Co.; Crouse-Hinds Co.; L. E. Mason Co. or equal.
5. Cast aluminum fittings (C's, T's, LB's, etc.) shall be of the mogul design (with rollers) as manufactured by Appleton Electric Co.
6. Conduit hubs shall be of the grounding type as manufactured by Myers Electric Products, Inc. or equal.
7. Conduit wall seals for cored holes shall be Type CSML as manufactured by the O.Z./Gedney Co. or equal.
8. Conduit wall and floor seals for sleeved openings shall be Type CSMI as manufactured by the O.Z./Gedney Co. or equal.
9. Combination expansion-deflection fittings embedded in concrete shall be Type XD as manufactured by the Crouse-Hinds Co.; O.Z./Gedney Co.; Spring City Electrical Mfg. Co. or equal.
10. Combination expansion-deflection fittings installed exposed shall be Type XJ as manufactured by Crouse-Hinds Co.; O.Z. Gedney Co.; Spring City Electrical Mfg. Co. or equal.
11. Conduit sealing bushings shall be O.Z./Gedney, Type CSB or equal.
12. Elbows and couplings shall be aluminum.
13. Electrical metallic tubing fittings shall be of the steel, raintight, concrete-tight, insulated throat (connectors), compression type as manufactured by the Appleton Electric Co.; Crouse-Hinds Co. or equal.

F. Conduit Mounting Equipment

1. In indoor areas, hangers, rods, backplates, beam clamps, channel, fasteners, anchors, nuts, washers, etc., shall be hot-dipped galvanized steel.
2. Expansion anchors (minimum 3/8" diameter) shall be equal to Kwik-Bolt as manufactured by the McCulloch Industries, Minneapolis, MI; Wej-it by Wej-it Expansion Products, Inc., Bloomfield, CO; or Kwik-Bolt II as manufactured by the Hilti Fastening Systems, Inc, Tulsa, OK. The length of expansion bolts shall be sufficient to place the wedge portion of the bolt a minimum of 1-in behind the steel reinforcement. Apply anti-seize compound to all nuts and bolts. Supports installed without the approved compound shall be dismantled and correctly installed, at no cost to the Owner.

G. Wall Opening Seals

1. Wall slab openings shall be sealed with "FLAME-SAFE" as manufactured by the Thomas & Betts Corp.; Pro Set Systems; Neer Mfg. Co.; Specified Technologies, Inc. or equal.

H. Cold Galvanizing Compound

1. Cold galvanizing compound shall be 95% zinc rich paint as manufactured by ZRC Products Company, a Division of Norfolk Corp. or equal.

PART 3 EXECUTION

3.01 RACEWAY APPLICATIONS

- A. Except where otherwise noted, all indoor wiring shall be in rigid aluminum.
- B. Rigid aluminum conduit shall be used at all locations (underground and within structures).
- C. Electrical metallic tubing and fittings may be used only in administration and office areas. Electrical metallic tubing and fittings shall not be embedded in concrete, installed outdoors, in process areas, shops, maintenance areas, electrical rooms, etc.
- D. All conduit of a given type shall be the product of one manufacturer.

3.02 BOX APPLICATIONS

- A. Unless otherwise specified herein all boxes shall be metal.
- B. Exposed switch, receptacle and lighting outlet boxes and conduit fittings shall be cast aluminum.
- C. Concealed switch, receptacle and lighting outlet boxes shall be pressed steel. Welded seamed boxes will not be permitted.
- D. Terminal boxes, junction boxes and pull boxes shall have NEMA ratings suitable for the location in which they are installed.

3.03 FITTINGS APPLICATIONS

- A. Combination expansion-deflection fittings shall be used where conduits cross structure expansion joints. Provide bonding jumpers around fittings.

- B. Conduit wall seals shall be used where underground conduits penetrate walls.
- C. Conduit sealing bushings shall be used to seal conduit ends exposed to the weather.

3.04 INSTALLATION

- A. No conduit smaller than 3/4 inch electrical trade size shall be used, nor shall any have more than the equivalent of three 90 degree bends in any one run. Pull boxes shall be provided as required or directed.
- B. No wire shall be pulled until the conduit system is complete in all details; in the case of concealed work, until all rough plastering or masonry has been completed; in the case of exposed work, until the conduit system has been completed in every detail.
- C. The ends of all conduits shall be tightly plugged to exclude dust and moisture during construction.
- D. Conduit supports, other than for underground raceways, shall be spaced at intervals of 8-ft or less, as required to obtain rigid construction.
- E. Single conduits shall be supported by means of aluminum one-hole pipe clamps in combination with aluminum one-screw back plates, to raise conduits from the surface. Multiple runs of conduits shall be supported on trapeze type hangers with steel horizontal members and threaded hanger rods. The rods shall be not less than 3/8-in diameter. Surface mounted panel boxes, junction boxes, conduit, etc, shall be supported by spacers to provide a minimum of 1/2-in clearance between wall and equipment.
- F. Conduit hangers shall be attached to structural steel by means of beam or channel clamps. Where attached to concrete surfaces, concrete expansion anchors shall be provided.
- G. All conduits on exposed work, within partitions and above suspended ceilings, shall be run at right angles to and parallel with the surrounding wall and shall conform to the form of the ceiling. No diagonal runs will be allowed. Bends in parallel conduit runs shall be concentric. All conduit shall be run perfectly straight and true.
- H. Conduit terminating in pressed steel boxes shall have double locknuts (aluminum) and insulated grounding bushings.
- I. Conduits containing equipment grounding conductors and terminating in sheet steel boxes shall have insulated throat grounding bushings with lay-in type lugs.
- J. Conduits shall be installed using threaded fittings unless otherwise specified herein.

- K. Aluminum fittings and boxes shall be used with aluminum conduit. Aluminum conduit shall not be imbedded in concrete containing chlorides, unwashed beach sand, sea water, or coral bearing aggregates. Aluminum conduit shall be isolated from other metals with heat shrink tubing (Raychem or equal) or plastic-coated hangers. Strap wrenches shall be used for tightening aluminum conduit. Pipe wrenches, channel locks, chain wrenches, pliers, etc. shall not be used.
- L. All threads on aluminum conduit and fittings shall be cleaned and coated with "No-Oxide" compound before installing.
- M. Aluminum conduit installed in concrete or below grade shall be completely covered with two (2) coats of bitumastic paint or with heat shrink tubing (Raychem or equal).
- N. Where conduits pass through openings in walls or floor slabs, the remaining openings shall be sealed against the passage of flame and smoke.
- O. Conduit ends exposed to the weather shall be sealed with conduit sealing bushings.
- P. All conduit entering or leaving a switchboard, panelboard or other multiple compartment enclosure shall be stubbed up into the bottom horizontal wireway or other manufacturer designated area, directly below the vertical section in which the conductors are to be terminated.
- Q. Spare conduits and conduit stubouts for future construction shall be provided with threaded PVC end caps at each end.
- R. No unbroken run shall exceed 300 feet in length. This length shall be reduced by 75 feet for each 90 degree elbow.
- S. Splices shall not be made in above or below grade pull boxes unless otherwise indicated and approved in writing by the Engineer or Owner.
- T. All risers from underground, concrete pads, floors, etc. shall be provided with heat shrink tubing (Raychem Co. or equal) from a point 1 foot-0-inch below bottom of slab or grade to a point not less than 6 inches above grade or surface of slab.
- U. Existing conduits are to be reused only where specifically noted. Mandrels shall be pulled through all existing conduits which will be reused and through all new conduits 1-1/2-in in diameter and larger prior to installing conductors.
- V. 3/16-in polypropylene pull lines shall be installed in all new conduits noted as spares or designated for future.
- W. Where no size is indicated for junction boxes, pull boxes or terminal cabinets, they shall be sized in accordance with the requirements of NEC Article 314.
- X. Conduits shall not cross pipe shafts, access hatches or vent duct openings. They shall be routed to avoid such present or future openings in floor or ceiling construction.
- Y. The use of running threads is prohibited. Where such threads are necessary, a 3-piece cast aluminum union shall be used.
- Z. Conduits passing from heated to unheated spaces, exterior spaces, refrigerated spaces, cold air plenums, etc, shall be sealed with "Duxseal" as manufactured by Manville or seal fitting to prevent the accumulation of condensation.

- AA. All field cut ends of hot dipped galvanized mounting channel shall be cleaned and painted with cold galvanizing compound before installation.
- BB. Control conduits shall be separated from power conduits by a minimum of 12 inches unless specifically noted otherwise. Crossing of control conduits with power conduits shall be kept to a minimum and where they must cross they shall cross at 90 degree angles.

END OF SECTION

SECTION 16120
WIRES AND CABLES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish, install and test all wire, cable and appurtenances as specified herein.

1.02 SUBMITTALS

- A. Submit to the Engineer samples of proposed wire. Each sample shall have the size, type of insulation and voltage stenciled on the jacket.
- B. Approved samples will be sent to the project location for comparison by the Resident Engineer/Owner with the wire actually installed.
- C. Installed unapproved wire shall be removed and replaced at no additional cost to the Owner.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Carefully handle all conductors to avoid kinks and damage to insulation.

PART 2 PRODUCTS

2.01 GENERAL

- A. Wires and cables shall be of annealed, 98 percent conductivity, soft drawn copper.
- B. All power conductors shall be stranded. Lighting wiring may be solid.
- C. Except for control circuits, wire smaller than No. 12 AWG shall not be used.
- D. All wire of a given type shall be the product of a single manufacturer.

2.02 MATERIALS

- A. 600 Volt or Less Wire and Cable
 - 1. Wire for lighting and other circuits not exceeding 150 volts to ground shall be NEC type XHHW. Below grade and underground, the wire shall be type XHHW.
 - 2. Wire for control circuits shall be #14 AWG minimum NEC type XHHW stranded.
 - 3. Equipment grounding conductors shall be installed in all raceways. Equipment grounding conductors shall be the same NEC type as the phase conductor, green and sized per NEC Table 250-122. Ground grid conductors shall be uninsulated.
 - 4. Type XHHW wire shall be as manufactured by the Southwire Co., Pirelli Cable Corp., Okonite Co., or equal.

5. Multi-conductor control cable shall be stranded, #14 AWG, 600 V, cross-linked polyethylene insulated w/PVC jacket. Type "XLP" as manufactured by the Southwire Co., American Insulated Wire Corp., or equal.

2.03 TERMINATIONS AND SPLICES (POWER CONDUCTORS)

- A. Unless otherwise indicated on the plans, no splices may be made in the cables without prior written approval of the Engineer. Where splicing is approved, then splicing material shall be approved by the Engineer and cable manufacturer. Splicing materials for all 600 volt splices shall be made with long barrel tin plated copper compression (hydraulically pressed) connectors and insulated with heavy wall heat shrinkable tubing. The conductivity of all completed connections shall be not less than that of the uncut conductor. The insulation resistance of all completed connections of insulated conductors shall be not less than that of the uncut conductor.
- B. Lugs for No. 10 AWG and smaller wire shall be locking spade type with insulated sleeve. Lugs shall be as manufactured by the Thomas and Betts Co., or equal.

2.04 TERMINATION AND SPLICES (CONTROL CONDUCTORS)

- A. Unless otherwise indicated on the plans, no splices may be made in the cables without prior written approval of the Engineer. Where splicing is approved, then splicing material shall be approved by the Engineer and cable manufacturer. Splicing materials and installation shall be as required by the Engineer. The conductivity of all completed connections shall be not less than that of the uncut conductor. The insulation resistance of all completed connections of insulated conductors shall be not less than that of the uncut conductor.
- B. Termination connectors shall be of the expanded vinyl insulated locking fork-end (upturned leg ends) type as manufactured by Ideal Industries; 3M Co.; Panduit Corp. or equal.

2.05 WIRE AND CABLE MARKERS

- A. Wire and cable markers shall be type written, heat shrinkable type as manufactured by the W.H. Brady Co., Thomas & Betts Co., 3M Co., or equal.
- B. Wire and cables with diameters exceeding the capacity of the heat shrinkable markers shall be marked with pre-printed, self-adhesive vinyl tapes as manufactured by the W.H. Brady Co., Panduit Corp., or equal.

2.06 WALL AND FLOOR SLAB OPENING SEALS

- A. Wall and floor slab openings shall be sealed with "FLAME-SAFE" as manufactured by the Thomas & Betts Corp. or equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Uniquely identify all wires, cables and each conductor of multi-conductor cables (except lighting and receptacle wiring) at each end with wire and cable markers.
- B. Use lubrications to facilitate wire pulling. Pulling compound shall be nontoxic, nonflammable, noncombustible and noncorrosive. The material shall be UL listed and compatible with the cable insulation and jacket.

- C. All wire and cable shall be continuous and without splices between points of connection to equipment terminals, except a splice will be permitted by the Engineer or Owner if the length required between the points of connection exceeds the greatest standard shipping length available from the manufacturer specified or approved by the Engineer or Owner as the manufacturer of the particular item or wire and cable.
- D. Seal openings in slabs and walls through which wires and cables pass.
- E. Pull cable from direction that requires the least tension.
- F. Feed cable into raceway with zero tension and without cable crossover at raceway entrance.
- G. Use a feed-in tube and sheave designed for cable installation. Use sheaves with radii that exceed the cable manufacturer's recommended minimum bending radius.
- H. Use a dynamometer (as required) and constant velocity power pulling. Velocity should not be less than 15-ft./min or more than 50-ft/min. Do not exceed the cable manufacturer's maximum recommended tension.
- I. If cable cannot be terminated immediately after installation install heat shrinkable end caps.
- J. Hydraulically or manually operated cable benders shall not be used unless approved in writing by the Engineer/Owner.

3.02 WIRE COLOR CODE

- A. All wire shall be color coded or coded using electrical tape in sizes where colored insulation is not available. Where tape is used as the identification system, it shall be applied in all junction boxes, manholes and other accessible intermediate locations as well as at each termination.
- B. The following coding shall be used:

<u>System</u>	<u>Wire</u>	<u>Color</u>
240/120 Volts Single-Phase, 3 Wire	Neutral	White
	Line 1	Black
	Line 2	Red
208Y/120, Volts 3 Phase, 4 Wire	Neutral	White
	Phase A	Black
	Phase B	Red
	Phase C	Blue
240/120 Volts 3 Phase, 4 Wire delta, center tap ground on phase coil A-C	Neutral	White
	Phase A	Black
	Phase B (High)	Orange
	Phase C	Blue
480Y/277 Volts 3 Phase, 4 Wire	Neutral	White
	Phase A	Brown
	Phase B	Orange

	Phase C	Yellow
Control (Individual Conductors)	AC	Red
	DC	Blue

3.03 FIELD TESTING

- A. Test all 600 volt wire insulation with a megohm meter after installation and prior to termination. Make tests at not less than 1000 volts DC. Submit a written test report of the results to the Engineer. Notify Engineer in writing 48 hours prior to testing.
- B. Field testing and commissioning shall be done in accordance with the latest revision of the "Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems" published by the InterNational Electrical Testing Association (NETA Standard ATS-1999) unless otherwise modified by this Section. Minimum wire insulation resistance shall not be less than 250 Megohms.

END OF SECTION

SECTION 16150

MOTORS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. All motors shall be furnished as called for in other Sections of these Specifications and shall be in conformance with the requirements of this section.

1.02 QUALIFICATIONS

- A. Routine tests shall be performed on representative motors, and shall include the information described on NEMA MG1-12.54 "Report of Test Form for Routine Tests on Induction Motors". Efficiency shall be determined in accordance with IEEE Publication No. 112, Method B. Power factor shall be measured on representative motors.

1.03 SUBMITTALS

- A. Submittal of motor data for acceptance shall include complete nameplate data and test characteristics in accordance with NEMA Standard MG1-12.54 "Report of Test Form for Routine Tests on Induction Motors" and, in addition, the following for motors typical of the units furnished:
 - 1. Efficiency at $\frac{1}{2}$, $\frac{3}{4}$ and full load
 - 2. Power factor at $\frac{1}{2}$, $\frac{3}{4}$ and full load
 - 3. Motor outline, dimensions and weight
 - 4. Descriptive bulletins, including full description of insulation system
 - 5. Bearing design data
 - 6. Special features (i.e., space heaters, temperature detectors, etc.)
- B. The motor manufacturer shall submit to the Owner or Owner Representative, certified dimension prints showing nameplate data and outline dimensions within three weeks of the date they receive the order.
- C. Guarantee: All equipment furnished and installed under this Section shall be guaranteed against defects of workmanship, materials and proper installation for a period of one (1) year from date of acceptance. All such equipment or parts proven defective, due to the above noted causes, shall be replaced in the machines by the Contractor at no expense to the Owner.
- D. Provide a one year equipment warranty.

1.04 REFERENCE STANDARDS

- A. Institute of Electrical and Electronics Engineers (IEEE)

- B. National Electrical Manufacturers Association (NEMA)
- C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

PART 2 PRODUCTS

2.01 GENERAL

- A. Unless otherwise noted, all motors ½ through 100 horsepower shall be rated 230/460 volt, 3 phase, 60 Hertz A.C.; motors 125 horsepower and above shall be rated 460 volt, 3-phase, 60 Hertz, and motors below ½ horsepower shall be rated 115/230 volt, 1 phase, 60 Hertz A.C.
- B. All motors used with variable frequency drives shall be rated for inverter duty and shall be in accordance with NEMA MG1-2003, Section IV, Part 31.
- C. All motors shall be built in accordance with current NEMA, IEEE, ANSI and AFBMA standards. Motors shall be of the type and quality described by this Section and other Divisions of the Specifications, fully capable of performing in accordance with Manufacturer's nameplate rating, and free from defective material and workmanship.

2.02 RATINGS

- A. All motors shall be sufficient size for the duty to be performed and shall not exceed their full-rated load when the driven equipment is operating at specified capacity and over the operational range. Unless otherwise noted, motors driving pumps, blowers, etc. shall not be overloaded at any head or discharge condition. The motor shall not be required to deliver more than its rated nameplate horsepower, at the 1.0 service factor, under any condition of mechanical or hydraulic loading (i.e. although a 1.15 service factor is required, it may not be used under any condition).
- B. Each motor shall develop ample torque for its required service throughout its acceleration range at a voltage 10 percent below nameplate rating. For motors that are to be operated on a reduced voltage starter, the motor shall develop ample torque under the conditions imposed by the reduced voltage starting method.
- C. All motors shall be continuous time rated suitable for operation in a 40 degrees C ambient unless noted otherwise.
- D. Specific motor data such as Hp, rpm, etc., is specified under the detailed specification for the equipment with which the motor is supplied.

2.03 NAMEPLATES

- A. The motor manufacturer's nameplates shall be engraved or embossed on stainless steel and fastened to the motor frame with stainless steel screws or drive pins. Nameplates shall indicate clearly all of the items of information enumerated in NEMA Standard MG1-10.38 or MG1-20.60, as applicable.

2.04 CONDENSATION HEATERS

- A. Condensation heaters, where specified herein or under the detailed mechanical specifications shall be of the cartridge or flexible wrap around type installed within the motor enclosure adjacent to

core iron. Heaters shall be rated for 120 Volt, single phase with wattage as required. The heater wattage and voltage shall be embossed on the motor nameplate.

2.05 WINDING TEMPERATURE DETECTORS

- A. Winding temperature detectors, unless specified otherwise herein shall be a factory installed, embedded, bi-metallic switch type with leads terminating in the main conduit box. This device shall protect the motor against damage from overheating caused by single phasing, overload, high ambient temperature, abnormal voltage, locked rotor, frequent starts or ventilation failure. The switch shall have normally open contacts. Not less than three detectors shall be furnished with each motor.
- B. All motors operating with variable frequency drives shall be equipped with winding temperature detectors.

2.06 THREE PHASE INDUCTION MOTORS

- A. Motors 50 horsepower and larger shall have a 120-volt space heater for moisture control.
- B. Unless specifically noted in other Sections of these Specifications, all motors shall have minimum efficiencies as listed below:

<u>Horsepower</u>	<u>NEMA Nominal Efficiency, %</u>
1-2	84.0
3-5	88.5
7-1/2	89.5
10	90.2
15	91.0
20	92.0
25	92.2
30	92.4
40-50	94.0
60-100	94.5

2.07 CONSTRUCTION

- A. General:
 - 1. All drip-proof and weather protected Type I and Type II motors shall have epoxy encapsulated windings. Totally enclosed motors shall be provided with an upgraded insulation by additional dips and bakes to increase moisture resistance and shall not be encapsulated. Motors for outdoor service shall have vacuum pressure impregnated (VPI) epoxy insulation for moisture resistance. Two speed motors shall be of the two winding type.
 - 2. Squirrel-cage rotors shall be made from high-grade steel laminations adequately fastened together and to the shaft, or shall be cast aluminum or bar-type construction with brazed end rings.
 - 3. All motors shall be of the premium efficiency and high power factor type. All motors shall be the corrosion resistant type conforming to motors designated as "Corro-Duty" by U.S.

Motors or equal.

4. Vertical motors shall be hollow or solid shaft as required by the equipment furnished under other Sections of these Specifications.
5. Totally enclosed non-ventilated (TENV) motors shall include the same ratings and accessories as specified for TEFC motors.

B. Low Voltage, Three Phase Motors:

1. Motors shall be of the squirrel-cage induction type. Horizontal, vertical solid shaft, vertical hollow shaft, normal thrust and high thrust types shall be furnished as specified in other Sections of these specifications. Motors shall be of the type and quality described by these Specifications, fully capable of performing in accordance with Manufacturer's nameplate rating, and free from defective material and workmanship.
2. Motors shall have normal or high starting torque (as required), low starting current (not to exceed 650 percent full load current), and low slip.
3. Unless otherwise specified, motors shall be totally enclosed fan-cooled construction with a 1.15 service factor at the Class B Temperature-Rise.
4. The output shaft shall be suitable for direct connection or belt drive as required.
5. Motors shall have a Class F non-hygroscopic insulation system but shall be limited to Class B Temperature-Rise, at 1.15 service factor.
6. All motors shall have a final coating of chemical resistant corrosion and fungus protective epoxy fortified enamel finish sprayed over red primer over all interior and exterior surfaces. Stator bore and rotor of all motors shall be epoxy coated.
7. All fittings, bolts, nuts, and screws shall be plated to resist corrosion. Bolts and nuts shall have hex heads.
8. All machine surfaces shall be coated with rust inhibitor for easy disassembly.
9. Conduit box shall be split from top to bottom and shall be capable of being rotated to four 90 degree positions. Synthetic rubber-like gaskets shall be provided between the frame and the conduit box and sealed with a non-wicking, non-hygroscopic insulating material. A frame mounted pad with drilled and tapped hole, not less than 1/4-inch diameter, shall be provided inside the conduit box for motor frame grounding. All motor conduit boxes shall be provided as required by new equipment sizes and locations. Boxes shall be suitably sized for conductor bending and terminations.
10. Totally enclosed motors shall be provided with condensate drain hole and epoxy coated motor windings to protect against moisture.
11. Nameplates shall be stainless steel. Lifting lugs or "O" type bolts shall be supplied on all frames 254T and larger. Enclosures shall have stainless steel screens. Motors shall be protected for corrosion, fungus and insects.

12. Low voltage, three phase motors shall be manufactured by U.S. Motors, Reliance Electric or Baldor.
13. Fractional Horsepower:
 - a. Fractional horsepower motors shall be rigid, welded-steel, designed to maintain accurate alignment of motor components and provide adequate protection. End shields shall be cast iron or heavy fabricated steel. Windings shall be of varnish-insulated wire with slot insulation of polyester film, baked-on bonding treatment to make the stator winding strongly resistant to heat, aging, moisture, electrical stresses and other hazards.
 - b. Motor shaft shall be made from high-grade, cold-rolled shaft steel with drive-shaft extensions carefully machined to standard NEMA dimensions for the particular drive connection.
 - c. For light to moderate loading, bearings shall be quiet all-angle sleeve type with large oil reservoir that prevents leakage and permits motor operation in any position.
 - d. For heavy loading, bearings shall be carefully selected precision ball bearings with extra quality, long-life grease, and large reservoir providing 10 years normal operation without re-lubrication.
14. Integral Horsepower:
 - a. Motor frames and end shields shall be cast iron or heavy fabricated steel of such design and proportions as to hold all motor components rigidly in proper position and provide adequate protection for the type of enclosure employed.
 - b. Windings shall be adequately insulated and securely braced to resist failure due to electrical stresses and vibrations.
 - c. The shaft shall be made of high-grade machine steel or steel forging of size and design adequate to withstand the load stresses normally encountered in motors of the particular rating. Bearing journals shall be ground and polished.
 - d. Rotors shall be made from high-grade steel laminations adequately fastened together, and to the shaft. Rotor squirrel-cage windings may be cast-aluminum or bar-type construction with brazed end rings.
 - e. Motors shall be equipped with vacuum-degassed anti-friction bearings made to AFBMA Standards, and be of ample capacity for the motor rating. The bearing housing shall be large enough to hold sufficient lubricant to minimize the need for frequent lubrication, but facilities shall be provided for adding new lubricant and draining out old lubricant without motor disassembly. The bearing housing shall have long, tight, running fits or rotating seals to protect against the entrance of foreign matter into the bearings, or leakage of lubricant out of the bearing cavity.
 - f. Bearings of high thrust motors will be locked for momentary upthrust of 30 percent downthrust. All bearings shall have a minimum B10 life rating of 5 years in accordance with AFBMA life and thrust values.

- g. Vertical hollow-shaft motors will have non-reverse ratchets to prevent backspin. Non-reverse ratchets shall be suitable for duty with variable frequency drives.

C. Low Voltage, Single Phase Motors:

1. Single phase motors shall be split-phase and capacitor-start induction types rated for continuous horsepower. Motors shall be rated 115/230 volts, 60 Hertz, single phase, open drip-proof, or totally enclosed fan cooled as required by the specifications, with temperature rise in accordance with NEMA Standards for Class B insulation.
2. Totally enclosed fan cooled motors shall be designed for severe-duty.
3. Motors shall have corrosion and fungus protective finish on internal and external surfaces. All fittings shall have a corrosion protective plating.
4. Mechanical characteristics shall be the same as specified for polyphase fractional horsepower motors.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Motor Connections: All motors shall be connected to the conduit system by means of a short section 18-inch minimum of liquid tight conduit unless otherwise indicated. For all motor connections of No. 4 AWG or larger wire size, the Contractor shall install a grounding conductor in the conduit and terminate at main conduit box with approved ground lugs and clamps.
- B. Low Voltage: For wire sizes #8 AWG and larger, long barrel tin-plated copper compression (hydraulically pressed) type connections (Burndy Co., or equal) shall be installed on the branch circuit wires and the motor leads. Bolted connections shall utilize products which are rated for vibration applications (bolt, nut and spring washer). All connections shall be insulated with heavy duty heat shrinkable material (Raychem Corp. or equal).

3.02 TESTS AND CHECKS

- A. The following tests shall be performed on all motors after installation but before putting motors into service.
 1. The Contractor shall megger (1000 volts DC) each motor winding before energizing the motor, and, if insulation resistance is found to be low, shall notify the Engineer and shall not energize the motor. The following table gives minimum acceptable insulation resistance in megohms at various temperatures and for various voltages with readings being taken after one (1) minute of megger test run.

<u>Winding Temperature</u>		<u>Degrees Voltage</u>		
<u>F</u>	<u>C</u>	<u>115 V.</u>	<u>230 V.</u>	<u>460V.</u>
37	3.9	60	108	210
50	10	32	60	120
68	20	13	26	50
86	30	5.6	11	21
104	45	2.4	4.5	8.8
122	50	1	2	3.7
140	60	0.50	0.85	1.6

2. The Contractor shall check all motors for correct clearances and alignment and for correct lubrication, and shall lubricate if required in accordance with Manufacturer's instructions. The Contractor shall check direction of rotation of all motors and reverse connections if necessary. The correction for wrong rotational direction shall be made at the motor.
 3. All tests shall meet the requirements of, but not be limited to, IEEE 43, 85 and 112. Efficiency tests for IEEE 112 shall include Method B.
 4. The Contractor shall provide to the Engineer a typed list of all motors 1 HP and larger listing the no load motor current and voltage and the full load current and voltage. Any phase current imbalance greater than 10% shall be reported to the Engineer.
- B. Field testing and commissioning shall be done in accordance with the latest revision of the "Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems" published by the InterNational Electrical Testing Association (NETA Standard ATS-2003).

END OF SECTION

SECTION 00300, ATTACHMENT A
 BID FORM

DESIGN/BUILD DX HVAC IMPROVEMENTS FOR THREE COBB COUNTY BUILDINGS
 COBB COUNTY, GEORGIA
 SEALED BID 10-5507

Item No.	Phase of Work/Item Description	Approx. Quantity	Units	Unit Price	Totals
	Bid Pricing				
1	Design - Lump Sum Pricing by Facility				
1 A	Animal Control	1	LS		
1 B	Purchasing	1	LS		
1 C	Arts Place	1	LS		
2	Pre Construction Preparation - Lump Sum Pricing - Project Totals				
2 A	Work Execution Plan	1	LS		
2 B	Payment Bond	1	LS		
2 C	Performance Bond	1	LS		
2 D	Insurance	1	LS		
2 E	All other Pre Construction Preparation Work and Submittals	1	LS		
3	Installation of HVAC Systems and Local Controls - Lump Sum Pricing by Facility				
3 A	Animal Control	1	LS		
3 B	Purchasing	1	LS		
3 C	Arts Place	1	LS		
4	Equipment Allowances by Facility for HVAC Equipment and Local Controls				
4 A	Animal Control	1	Allowance		
4 B	Purchasing	1	Allowance		
4 C	Arts Place	1	Allowance		
5	Preparation and Submittal of Closeout Documents - Lump Sum Pricing - Project Totals	1	LS		
	Bid Total:				

SECTION 01025, ATTACHMENT B

MEASUREMENT AND PAYMENT TERMS
 DESIGN/BUILD DX HVAC IMPROVEMENTS FOR TEN COBB COUNTY BUILDINGS
 COBB COUNTY, GEORGIA

Item No.	Phase of Work/Item Description	Measurement and Payment Application Criteria	Reimbursement Calculation
1	Design This item includes: 1) Gathering of all necessary data and information for design and inspection of facilities to confirm existing conditions for design, 2) Preparation of 35% design documents and associated review sessions with the Owner, 3) Preparation of 95% design documents and associated review sessions with the Owner, and 4) Preparation of final design documents. 1A: Animal Control 1B: Purchasing HQ 1C: Arts Place	Application for payment for list items 1 and 2 can be made upon completion of the 35% review meeting and receipt of written confirmation that the design is at least 35% complete from the Owner. Application for payment for list Item 3 can be made upon completion of the 95% review meeting and receipt of written confirmation that the drawings are at least 95% complete from the Owner. Application for payment for the remaining funds can be made once the drawings are approved by all applicable regulatory authorities.	For 35% complete reimbursement shall be calculated by multiplying the bid lump sum amount by 35% For 95% complete reimbursement shall be calculated by multiplying the bid lump sum amount by 60% For 100% complete reimbursement shall be calculated by multiplying the bid lump sum amount by 5%
2	Pre Construction Preparation		
	2A Work Execution Plan	Application for payment may be made upon approval of the Construction Work Plan by the Owner.	Single disbursement at bid lump sum amount
	2B Payment Bond	Application for payment may be made upon receipt of an acceptable payment bond by the Owner.	Single disbursement at bid lump sum amount
	2C Performance Bond	Application for payment may be made upon receipt of an acceptable performance bond by the Owner.	Single disbursement at bid lump sum amount
	2D Insurance	Application for payment may be made upon receipt of an acceptable insurance certificate by the Owner.	Single disbursement at bid lump sum amount
	2E All other Pre Construction Preparation Work and Submittals - This item includes all required pre construction preparation items that are not included under items 1A, 1B, or 1C, including obtaining all necessary permits and approvals.	Application for payment may be made upon completion of all other pre-construction preparation work by the Remediation Subcontractor and acceptance of such work by the Owner.	Single disbursement at bid lump sum amount
3	Installation of HVAC Systems and Local Controls 1A: Animal Control 1B: Purchasing HQ 1C: Arts Place	Application for payment for installation of HVAC systems and local controls in each building may be made upon completion of all work, demonstration that the systems are fully operational, and final acceptance of the work by the Owner.	Payment will be a single disbursement at the bid lump sum amount for that facility.
4	Equipment Allowances		
	4A Animal Control	Application for payment for the equipment and materials associated with each building may be made upon completion of all work for that system, demonstration that the system is fully operational, and final acceptance of the work for that system by the Owner.	The identified allowances have been assigned only for the purpose of establishing funding for reimbursement of the Contractor's cost for equipment and materials for each building. The Contractor will be reimbursed his actual purchase price plus ten percent for equipment and material that has been installed at each building. Itemized invoices must be provided to the Owner with the request for payment for equipment and materials and the quantities must match the inventoried in-place quantities established by the Owner. Each itemized invoice must be certified by the seller.
	4B Purchasing		
	4C Arts Place		
5	Preparation and Submittal of Closeout Documents - This item includes preparation and submittal of all required closeout	Application for payment may be made upon approval of the close out documents by the Owner.	Single disbursement at bid lump sum amount



CONTRACT

Date: _____

Agreement between Owner and Design/Builder

Agreement for Design and Construction

AGREEMENT made as of the ___ day of _____ in the year 2010.

BETWEEN the Owner: Cobb County
Cobb County, Georgia
C/o Cobb County Property Management Department
57 Waddell Street
Marietta, Georgia 30060

and the Design/Builder: CONTRACTOR NAME

For the following Project: DESIGN/BUILD HVAC ENERGY EFFICIENCY HVAC RETROFITS

Animal Control Building, 1060 Al Bishop Drive, Marietta, Ga. 30008
Purchasing Department Headquarters, 1772 County Services Parkway, Marietta, Ga. 30008
and
The Arts Place, 3330 Sandy Plains Rd., Marietta, Ga. 30066

The engineering services described herein will be provided by the following person or entity who is lawfully licensed to practice engineering in Georgia:

NAME AND ADDRESS

The Owner and the Design/Builder agree as set forth below.

Terms and Conditions

1.0 GENERAL REQUIREMENTS

1.1 BASIC DEFINITIONS

1.1.1 The Contract Documents consist of the Owner's Request for Proposal, dated _____, 2010, Design Baseline Bid Documents, Design/Builder's Bid Proposal identified in Section 14, , including Specifications and Bid Addenda referenced below, this Agreement between Owner and Design/Builder for Final Design and Construction ("Agreement"), the Construction Documents to be approved by the Owner in accordance with Subparagraph 2.2.2 of this Agreement, and Modifications issued after execution of this Agreement. A Modification is a Change Order or a written amendment to this Agreement signed by both parties. The foregoing and following documents form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein.

Bid Addendum #xx dated xx/xx/2010

Bid Addendum #xx dated xx/xx/2010

Special Terms and Conditions of the American Recovery and Reinvestment Act Of 2009 (ARRA) and the Energy Efficiency and Conservation Block Grant (EECBG)

Immigration Reform and Control Act Contractor/Subcontractor Affidavits

Conflict of Interest Affidavit

Non-Collusion Affidavit

1.1.2 The Project, as identified above, is the total design and construction for which the Design/Builder is responsible under this Agreement, including all professional design services and all labor, materials, and equipment used or incorporated in such design and construction.

1.1.3 The Work comprises the completed construction designed under the Project and includes labor and supervision, materials, equipment, machinery, apparatus, tools, services, transportation and all other facilities, licenses, permits, taxes, fees, charges, excises, services and incidentals of any description whatsoever necessary to perform and completely finish in a workmanlike manner and to the complete satisfaction and approval of the Owner, free from all liens or claims of laborers, material men, suppliers, or subcontractors and in conformity in all respects with all applicable federal, state, county or municipal laws, ordinances, rules or regulations, all work and things contemplated by the Design Baseline Documents and the Contract Documents which are required of the Design/Builder.

1.2 EXECUTION, CORRELATION, AND INTENT

1.2.1 This Agreement shall be signed in not less than duplicate by the Owner and Design/Builder.

1.2.2 It is the intent of the Owner and Design/Builder that the Contract Documents include all items necessary for proper execution and completion of the Work. The Contract Documents must be taken as complementary, and any item of Work called for in any Contract Document shall be as binding as if called for by all. The Design/Builder understands that the Work shall be complete in every detail reasonably inferable from the Contract Documents as being necessary to produce the intended results notwithstanding the fact that every item involved is not particularly mentioned or shown. Words not otherwise specifically defined herein, which have a well-known technical or trade meaning, are used herein in accordance with such recognized or well-known meaning. If there is any conflict in the contract documents, the priority shall be as follows in descending order: Modifications to the Agreement, the Agreement, any Special Conditions, the Terms and General Conditions, the Specifications, the Drawings, the Design/Builder's Bid Proposal, and the Design Baseline Bid Documents

1.2.3 By executing this Agreement, the Design/Builder represents that it is an independent contractor and that it has:

- .1 read and studied the Contract Documents and understands the same;
- .2 familiarized himself with the local conditions under which the Work is to be performed; and
- .3 correlated his observations with the requirements of the Contract Documents.
- .4 Acknowledged that the Design Baseline Bid Documents are incomplete in defining the total scope of work, do not accurately define existing conditions whether exposed or hidden, and do not reflect all code requirements, agreements, conditions, ordinances, rules or regulations, which might affect this Project.

1.2.4 The Design/Builder shall designate in the Agreement a representative who shall have full authority to execute any and all instruments requiring the signature of the Design/Builder, and to otherwise act on behalf of the Design/Builder with respect to all matters arising out of the Contract Documents. The Design/Builder's designated representative will be authorized to execute all bonds, agreements, certificates, affidavits, applications and any and all instruments of any other nature whatsoever which may be required for the proper performance of the Work contemplated by the Contract Documents.

1.2.5 The Design/Builder represents that any reference by the Contract Documents to Cobb County as supplying utilities, permits, licenses, approvals, procedures or items of any nature whatsoever are included with the Design/Builder's cost and shall not be construed to mean that the cost of such items will be paid by Cobb County.

1.3 OWNERSHIP AND USE OF DOCUMENTS

1.3.1 All documents, including drawings, written information, estimates, specifications and other

documents and data are and remain the property of the Owner. The Design/Builder agrees that the Owner may reuse any and all drawings, written information, estimates, specifications and other documents and data described herein in the Owner's sole discretion without first obtaining permission of the Design/Builder and without payment of any monies to the Design/Builder therefore. However, any reuse of the documents by the Owner on a different site, without a new contract agreement, shall be at the Owner's risk and the Design Builder's Engineer and Consultants shall have no liability where such documents are reused. The Owner shall offer the Design Builder's Engineer the opportunity to negotiate a fee for such services but shall not be bound to accept the negotiated fee. Following such negotiations, should Owner determine Design Builder's Engineer's services/fee would not be in the Owner's best interest, Design Builder's Engineer and Consultants name and seal shall be removed and the construction documents redone according to licensing regulations prior to their reuse.

1.3.2 Submission or distribution of documents to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Design/Builder's or the Engineer's common law copyrights or other reserved rights. The Owner shall own neither the documents nor the copyrights.

2.0 DESIGN/BUILDER RESPONSIBILITIES

2.1 SERVICES AND RESPONSIBILITIES

2.1.1 Design services shall be performed by qualified engineers and other professionals selected and paid by the Design/Builder. The professional obligations of such persons shall be undertaken and performed in the interest of the Design/Builder. Construction services shall be performed by qualified construction contractors and suppliers, selected and paid by the Design/Builder and acting in the interest of the Design/Builder. Nothing contained in this Agreement shall create any professional obligation or contractual relationship between such persons and the Owner.

2.1.2 Intentionally Omitted

2.2 BASIC SERVICES

2.2.1 The Design/Builder's Basic Services are as described below and in Section 14.

2.2.2 Based on the Design Baseline Bid Documents and the Design/Builder's Bid Proposal, the Design/Builder shall submit Construction Documents for review and approval by the Owner. Construction Documents shall include technical drawings, schedules, diagrams, and specifications, setting forth in detail the requirements for construction of the Work and shall:

- .1 develops the intent of the Design Baseline Bid Documents in detail;
- .2 provide information necessary for the use of those in the building trades; and

.3 includes documents required for all regulatory agency approvals.

The Design/Builder hereby warrants that the Construction Documents prepared by the Design/Builder and its Engineer will be adequate and sufficient to accomplish the purposes of the Construction Project, and agrees that any review or approval of said documents by the Owner or otherwise shall not act to diminish or alter the Design/Builder's responsibilities under this Agreement.

2.2.3 The Design/Builder shall act as Owner's Agent in filing documents required to obtain necessary approvals of governmental authorities having jurisdiction over the Project, and shall be solely responsible for any violation by the Design/Builder, his employees or agents, of any Federal, State, City or Departmental laws, ordinances, or regulations. Design/Builder shall maintain compliance with all environmental related policies, procedures and applicable permits, regulations, codes and Americans with Disabilities Act requirements.

2.2.4 Unless otherwise provided in the Contract documents, the Design/Builder shall provide or cause to be provided and shall pay for all design services, labor, testing services, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, permits and City of Marietta required inspections, utility connection, assessment fees, transportation and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

2.2.5 The Design/Builder shall be responsible for and shall coordinate all construction means, methods, techniques, sequences, and procedures.

2.2.6 The Design/Builder shall keep the Owner informed of the progress and quality of the Work. The Design/Builder shall fax to the Owner, on a weekly basis, copies of the Superintendent's daily reports.

2.2.7 If requested in writing by the Owner, the Design/Builder, with reasonable promptness and in accordance with the time limits agreed upon, shall interpret the requirements of the Contract Documents. Claims, disputes, and other matters in question relating to performance there under by both Owner and Design/Builder shall be interpreted by the Owner. Such interpretations and decisions shall be in writing, shall not be presumed to be correct, and shall be given such weight, as the court shall determine.

2.2.8 The Design/Builder shall correct Work, which does not conform to the Construction Documents at no additional cost to Owner.

2.2.9 The Design/Builder warrants to the Owner that materials and equipment incorporated in the Work will be new unless otherwise specified, and that the Work will be of good quality, free from faults and defects, and in conformance with the Contract Documents. Work not conforming to these requirements shall be corrected in accordance with Section 9 of this Agreement.

2.2.10 The Design/Builder shall pay all sales, consumer, use, and similar taxes and shall secure and pay for building permit and all other permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the Work.

2.2.11 The Design/Builder shall give notices and comply with laws, ordinances, rules, regulations, and lawful orders of public authorities relating to the Project.

2.2.12 The Design/Builder shall pay all royalties and license fees. The Design/Builder shall defend suits or claims for infringement of patent rights and shall save the Owner and its Agents harmless from loss on account thereof, except that the Owner shall be responsible for such loss when a particular design, process or product of a particular manufacturer is required by the Owner. However, if the Design/Builder has reason to believe the use of a required design, process, or product is an infringement of a patent; the Design/Builder shall be responsible for such loss unless such information is promptly given to the Owner.

2.2.13 The Design/Builder shall be responsible to the Owner for acts and omissions of the Design/Builder's employees and parties in privity of contract with the Design/Builder, to perform a portion of the Work, including their agents and employees.

2.2.14 The Design/Builder shall keep the premises free from accumulation of waste materials or rubbish caused by the Design/Builder's, and it's subcontractor's operations. At the completion of the Work, the Design/Builder shall remove from and about the Project the Design/Builder's tools, construction equipment, machinery, surplus materials, waste materials, and rubbish.

2.2.15 The Design/Builder shall prepare Change Orders for the Owner's approval and execution in accordance with this Agreement and shall have authority to make minor changes in the design and construction consistent with the intent of this Agreement not involving an adjustment in the contract sum or an extension of the contract time. The Design/Builder shall promptly inform the Owner, in writing, of minor changes in the design and construction.

2.2.16 The Design/Builder shall notify the Owner when the Work is substantially completed by issuing a Certificate of Substantial Completion for the Owner's approval and if approved by the Owner's, shall establish the Date of Substantial Completion, shall state the responsibility of each party for security, maintenance, heat, utilities, damage to the Work and insurance, shall include a list of items to be completed or corrected and shall fix the time within which the Design/Builder shall complete items listed therein. Owner shall produce a list of items to be completed or corrected upon establishment of Date of Substantial Completion.

2.2.17 The Design/Builder shall maintain in good order at the site one record copy of the drawings, specifications, product data, samples, shop drawings, Change Orders and other Modifications, marked currently to record changes made during construction. These documents and materials shall be delivered to the Owner upon completion of the design and construction and prior to final payment.

2.2.18 The Design/Builder shall be responsible for the preservation of all public and private property, monuments, utility lines, etc., along and adjacent to the Work. The Design/Builder shall use every precaution necessary to prevent damage or injury thereto. The Design/Builder shall exercise suitable precaution necessary to prevent damage to pipes, conduits and other underground structures; and shall carefully protect from disturbance or damage all land monuments and property marks until an authorized representative of the Owner has witnessed or otherwise referenced their location, and shall not remove them until directed. When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the Work, or in consequence of the non-execution thereof on the part of the Design/Builder, his employees or agents, such property shall be restored by the Design/Builder, at the Design/Builder's expense. The Design/Builder will restore same to a condition similar or equal to that existing before such damage or injury was done, by repairing, rebuilding, or otherwise restoring same, or Design/Builder shall make good such damage or injury in an otherwise acceptable manner.

2.2.19 The Design/Builder shall furnish and pay for structural, mechanical, chemical, special inspections or other laboratory and on-site tests, inspections and reports as required by law or the Contract Documents.

2.2.20 The Design/Builder shall furnish services by land surveyors, geotechnical engineers and other consultants for any additional subsoil, air, and water conditions, when such services are deemed necessary by the Design/Builder to carry out properly the design services under this Agreement.

3.0 OWNER RESPONSIBILITIES

3.1 The Owner shall designate a representative authorized to act on the Owner's behalf with respect to the Project. The Owner or such authorized representative shall examine documents submitted by the Design/Builder and shall promptly render decisions pertain thereto to avoid delay in the orderly progress of the Work.

3.2 At the Owner's option, the Owner may appoint an on-site project representative to observe the Work and to have such other responsibilities as the Owner and Design/Builder agree in writing at any time after the execution of this Agreement.

3.3 The Owner shall cooperate with the Design/Builder in securing building and other permits, licenses, and inspections.

3.4 If the Owner observes or otherwise becomes aware of a fault or defect in the Work or nonconformity with the Design or Construction Documents, the Owner shall give prompt written notice thereof to the Design/Builder.

3.5 The Owner shall furnish required information and services and shall promptly render decisions pertaining thereto to avoid delay in the orderly progress of the design and construction.

3.6 The Owner shall, at the request of the Design/Builder and upon execution of this Agreement, provide a certified or notarized statement of funds available for the Project and their source.

3.7 The Owner shall communicate with contractors only through the Design/Builder.

4.0 CONSTRUCTION TIME

4.1 The Design/Builder shall provide services as expeditiously as is consistent with reasonable skill and care and the orderly progress of design and construction, and in accordance with the Schedule (as defined below), as may be amended by mutual agreement of the parties from time to time.

4.2 Time limits stated in Contract Documents are of the essence of this Agreement. The Work to be performed under this Agreement shall commence upon execution of a notice to proceed unless otherwise agreed and, subject to authorized Modifications, Substantial Completion shall be achieved as indicated in Section 14.

4.3 The Date of Substantial Completion of the Work or of a designated portion thereof is the date when construction is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy and utilize the Work for its intended use.

4.4 The Design/Builder shall prepare a design and construction schedule of Work consistent with Paragraph 4.2 above and present it to Owner for written approval prior to commencing the Work ("Schedule"). This schedule shall indicate the dates for the start and completion of the various stages of the Work, including the dates when information and approvals are required from the Owner. The Schedule shall be revised as required by the conditions of the Work.

4.5 If the Design/Builder is delayed in the progress of the Project by acts or neglect of the Owner, Owner's employees, separate contractors employed by the Owner, or changes ordered in the Work not caused by the fault of the Design/Builder, the contract time shall be reasonably extended by Change Order.

4.6 If, at any time during the course of the Work, the progress of the Work, in the Owner's judgment, raises a doubt as to the ability of the Design/Builder to meet the Contract Time, the Design/Builder shall confer and cooperate with the Owner in establishing a schedule for the Work which will assure its completion within the contract Time at no additional cost to the Owner.

4.7 Completion time will not be extended for normal bad weather. No change in contract sum will authorized because of adjustment of contract time due to weather.

4.8 It is further agreed that time is of the essence of each and every portion of this Agreement

and of the Specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the Agreement an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this Agreement. Extensions of time will be considered when the delay in completion of the work is due:

.1 To any preference, priority, or allocation order duly issued by the Government or Owner;

.2 To unforeseeable cause beyond the control and without the fault of negligence of the Contractor, restricted to, acts of God, or of the public enemy, acts of the Owner, fires, floods, epidemics, quarantine restriction, and extremely severe weather in excess of normal weather losses allowed in Paragraph 4.7. Production line schedule delays of the product manufacturers shall not be considered grounds for a time extension.

4.9 The Design/Builder shall within five (5) days from the beginning of such delay, unless the Owner shall grant a further period of time prior to the final settlement of the Agreement, notify the Owner, in writing, the causes of the delay for each delay caused by reasons other than weather. The Owner shall, where possible, ascertain the facts and extent of the delay or delays for claims, other than those caused by weather, filed by the Design/Builder between the 20th of the month to the 20th day of the previous month. If the Owner agrees with a time extension, the Design/Builder shall issue the monthly Pay Application accompanied by a Change Order. In cases where a claim is filed, except those that are of a continuing nature and extend beyond the normal monthly report period stated herein, the Owner shall ascertain the facts and render his decision within thirty (30) days of the receipt of the final data relating to the claim. If the Design/Builder fails to file claims within the time period specified herein for delays, it shall be considered prima facie evidence that no basis for a claim exists.

4.10 The Design/Builder acknowledges and understands that if Substantial Completion of the project is delayed beyond the Date of Substantial Completion(as defined in Section 14 hereof), the Owner will suffer, sustain and incur substantial commercial and economic loss, damage and detriment, including, without limitation, loss of income, profits and operating revenues from the Project and extended interest costs, the precise magnitude and extent of all of which may be difficult to ascertain. Accordingly, it is the intent and desire of the parties (and an inducement to the Owner to enter into this Agreement with the Design/Builder) to agree in advance upon the amount of compensation which the Owner will be entitled to receive from the Design/Builder if Substantial Completion of the Project is not achieved on or before the Date of Substantial Completion. For each calendar day that Substantial Completion of the Project is delayed beyond the Date of Substantial Completion (as the same may be extended for excusable delays allowed hereunder), the Design/Builder shall pay to Owner the sum of **\$200.00** per day for each facility so delayed until Substantial Completion is achieved. Said sum shall constitute liquidated damages and not a penalty and is deemed reasonable by the parties in light of the circumstances and the anticipated actual loss, damage or detriment which the Owner will suffer, sustain and incur if completion of the Project is delayed. The Owner shall be entitled to retain, receive and recover such liquidated damages from the Design/Builder solely on the basis of the Design/Builder's failure to achieve the Agreed Completion Date, without the necessity of proving or establishing any underlying cause or actual amount of loss or damage sustained, it being the intent and purpose of the parties to preclude the

necessity of any such proof by negotiating and agreeing in advance upon the amount of such liquidated damages as herein provided. Such liquidated damages may be withheld by the Owner from the balance due to the Design/Builder under this Agreement as and when such damages accrue and payments become due to the Design/Builder hereunder or, if such liquidated the Design/Builder for breach of this Agreement, including, without limitation, Owner's right to terminate this Agreement.

5.0 PAYMENTS

5.1 PROGRESS PAYMENTS

5.1.1 The Design/Builder shall deliver to the Owner itemized Applications for Payment in such detail as indicated in Section 14.

5.1.2 Within thirty days of the Owner's receipt of a properly submitted and correct Application for Payment and approval by the Owner, the Owner shall make payment to the Design/Builder.

5.1.3 The Application for Payment shall constitute a representation by the Design/Builder to the Owner that, to the best of the Design/Builder's knowledge, information, and belief the design and construction have progressed to the point indicated. The quality of the Work covered by the application is in accordance with the Contract Documents; and the Design/Builder is entitled to payment in the amount requested. r=

5.1.4 The Design/Builder shall pay each contractor, upon receipt of payment from the Owner, out of the amount paid to the Design/Builder on account of such contractor's work, the amount to which said contractor is entitled in accordance with the terms of the Design/Builder's contract with such contractor. The Design/Builder shall, by appropriate agreement with each contractor, require each contractor to make payments to subcontractors in similar manner.

5.1.5 The Owner shall have no obligation to pay or to be responsible in any way for payment to a contractor of the Design/Builder except as may otherwise be required by law.

5.1.6 No progress payment or partial or entire use or occupancy of the Project by the Owner shall constitute an acceptance of Work not in accordance with the Contract Documents.

5.1.7 The Design/Builder warrants that:

(1) Title to Work, materials and equipment covered by an Application for Payment will pass to the Owner either by incorporation in construction or upon receipt of payment by the Design/Builder, whichever occurs first;

(2) Work, materials and equipment covered by previous Applications for Payment are free and clear of liens, claims, security interests or encumbrances, hereinafter referred to as "liens"; and

(3) no Work, materials or equipment covered by an Application for Payment will have been acquired by the Design/Builder, or any other person performing work at the site or furnishing materials or equipment for the Project, subject to an agreement under which an interest therein or

encumbrance thereon is retained by the seller or otherwise imposed by the Design/Builder or such other person.

5.1.8 The Design/Builder will receive the payments made by the Owner and the Design/Builder will hold such payments as a trust fund to be applied first to the payment of laborers, suppliers, subcontractors, and others responsible for the Work for which such payments are made, including sufficient funds so that all taxes and insurance applicable thereto are also paid. The Design/Builder shall first apply all progress payments as trustee to satisfy all obligations the Design/Builder has incurred due to the Work, and shall comply with all laws applicable thereto.

5.1.9 The Design/Builder shall, as often as requested by the Owner, furnish such information, evidence and substantiation as the Owner may require with respect to the extent and value of current progress and the nature and extent of all obligations incurred by the Design/Builder in connection with the Work and all payments made by the Design/Builder on account thereof. The Design/Builder shall also furnish, as required by the Owner in its sole discretion, such partial or final lien waivers or releases as the Owner deems necessary to ensure that the Design/Builder has paid all persons furnishing any labor, material, or services in furtherance of any Work furnished hereunder. If required by the Owner, the furnishing of such lien waivers and releases shall be a condition precedent to any payment hereunder. Nothing herein shall constitute any requirement that the Owner exercise its discretionary option to require such releases and waivers. Moreover, no prior failure of the Owner to require such releases and waivers shall limit the Owner's right to require them subsequently.

5.1.10 The Owner reserves the right to withhold, as an additional reserve and without limiting its other rights and remedies, an amount sufficient: (a) to defend, satisfy and discharge any asserted claim that the Design/Builder (or anyone providing any of the Work hereunder) has failed to make payment for labor, services, materials, equipment, taxes, or other items or obligations furnished or incurred in connection with the Work or has caused damage to the Work or to any other work on the Project; (b) to complete the Work if it appears that funds remaining in the Contract, including retainage and exclusive of back charges, are insufficient to complete the Work; (c) to reimburse the Owner for any back charges incurred as a result of any act or omission by the Design/Builder hereunder; (d) to protect the Owner from the possible consequences of any other breach or default by the Design/Builder hereunder; or (e) to secure the Owner with respect to any breach or default by the Design/Builder or its affiliates, parent company and subsidiaries under any other agreement. Payment hereunder shall not be evidence of the proper performance or progress of the Work and no payment shall be construed to be acceptance of defective, faulty, or improper work or materials.

Without limiting the provisions of the previous paragraph, the Owner may retain from each progress payment made prior to the time of Substantial Completion ten percent (10%) of the amount otherwise due after deduction of any amounts as provided in the preceding sentence, and in no event to exceed any applicable statutory requirements. If the Owner elects to use this retainage provision:

- .1 at the time the work is fifty percent complete, the Owner shall withhold no additional retainage and shall pay the Design/builder the full amount of what is on account of progress payments;
- .2 the Owner may, in its sole discretion, reduce the amount to be retained at any time;
- .3 the Owner may release retainage on that portion of the work a Subcontractor has completed, in whole or in part, and which Work the Owner has accepted;
- .4 in lieu of retainage, the Design/builder may furnish a retention bond, acceptable to the Owner, to be held by the Owner.

5.1.11 The Owner shall make a progress payment to the Design/Builder equal to the value of the completed Work and Stored Work as of the corresponding Monthly Billing Date, to the extent approved by the Owner, and after deducting (a) all previous payments, (b) current retainage (to a maximum of 10 percent of each progress payment; provided, however, that, when 50 percent of the contract value including change orders and other additions to the Contract value provided for by the Contract Documents is due and the manner of completion of the contract Work and its progress are satisfactory to the Owner, the Owner shall withhold no more retainage. If after discontinuing the retention, the Owner determines that the Work is unsatisfactory or has fallen behind schedule, retention may be resumed at the previous level.), and (c) all charges or back charges for services, materials, equipment, or other items furnished or otherwise chargeable to the Design/Builder.

5.2 FINAL PAYMENT

5.2.1 At substantial completion of the Work and as the Owner determines the Work to be reasonably satisfactory, the Owner shall within 30 days after the last of the following to occur: (a) delivery of a final application for payment, (b) furnishing of evidence satisfactory to the Owner that there are no claims, obligations, or liens outstanding or unsatisfied for labor, services, materials, equipment, taxes, or other items performed, furnished or incurred in connection with the Work, (c) delivery of all guaranties, warranties, bonds, instruction manuals, performance charts, diagrams, as-built drawings and similar items required of the Design/Builder or the Design/Builder's suppliers or subcontractors, and (d) delivery of a general release, in a form satisfactory the Owner, executed by the Design/Builder running to and in favor of the Owner, and such other parties as the Owner may require, pay the retainage to the Design Builder. If at that time there are any remaining incomplete minor items, an amount equal to 200 percent of the value of each item as determined by the Owner shall be withheld until such item or items are completed to the Owner's satisfaction.

5.2.2 Neither final payment nor amounts retained, if any, shall become due until the Design/Builder submits to the Owner (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Project for which the Owner or Owner's property might be liable have been paid or otherwise satisfied, (2) consent of surety, if any, to final payment, (3) a

certificate that insurance required by the Contract Documents is in force following completion of the Work, and (4) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens arising out of the Agreement, to the extent and in such form as may be designated by the Owner. If a contractor refuses to furnish a release or waiver required by the Owner, the Design/Builder may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Design/Builder shall reimburse the Owner for moneys the latter may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

5.2.3 The making of final payment shall constitute a waiver of all claims by the Owner except those arising from:

- .1 unsettled liens;
- .2 faulty or defective Work appearing after Substantial Completion;
- .3 failure of the Work to comply with requirements of the Contract Documents; or
- .4 terms of special warranties required by the Contract Documents.

5.2.4 Acceptance of final payment shall constitute a waiver of all claims by the Design/Builder except those previously made in writing and identified by the Design/Builder as unsettled at the time of final Application for Payment.

6.0 PROTECTION OF WORK, PEOPLE, AND PROPERTY

6.1 The Design/Builder shall be responsible for initiating, maintaining, and providing supervision of safety precautions and programs in connection with the Work.

6.2 The Design/Builder shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to:

- (1) Employees on the Work and other persons who may be affected thereby;
- (2) The Work and materials and equipment to be incorporated therein; and
- (3) Other property at or adjacent to the site.

6.3 The Design Builder shall give notices and comply with applicable laws, ordinances, rules, regulations, and orders of public authorities bearing on the safety of persons and property and their protection from damage, injury, or loss.

6.4 The Design/Builder shall be liable for damage or loss to property at the site caused in whole or in part by the Design/Builder, a contractor of the Design/Builder or anyone directly or indirectly employed by either of them, or by anyone for whose acts they may be liable, except damage or loss attributable to the acts or omissions of the Owner, the Owner's separate contractors or anyone directly or indirectly employed by them or by anyone for whose acts they may be liable and not

attributable to the fault or negligence of the Design/Builder.

7.0 DESIGN/BUILDER'S INSURANCE AND BONDS

7.1 DESIGN/BUILDER'S LIABILITY INSURANCE

7.1.1 The Design/Builder shall purchase and for the duration of the Agreement maintain in a company or companies authorized to do business in the State of Georgia, having a rating with A. M. Best & Co. of A-VII or better and acceptable to Owner, such insurance as will protect the Design/Builder from claims set forth below which may arise out of or result from operations under the Contract by the Design/Builder or by a contractor of the Design/Builder, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable:

- .1 claims under workers' or workmen's compensation, disability benefit and other similar employee benefit laws and acts which are applicable to the Work to be performed;
- .2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Design/Builder's employees;
- .3 claims for damages because of bodily injury, sickness or disease, or death of persons other than the Design/Builder's employees;
- .4 claims for damages covered by usual personal injury liability coverage which are sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Design/Builder or (2) by another person;
- .5 claims for damages, other than to the Work at the site, because of injury to or destruction of tangible property, including loss of use;
- .6 claims for damages for bodily injury or death of a person or property damage arising out of ownership, maintenance, or use of a motor vehicle;
- .7 claims for damages because of professional errors and omissions; and
- .8 claims for contractually assumed liability under this agreement.

7.1.2 The insurance required by the above Subparagraph 7.1.1 shall be written for not less than limits of liability specified as follows or required by law, whichever are greater:

- .1 Worker's Compensation
 - (a) State: Statutory
 - (b) Applicable Federal: Statutory
 - (c) Employer's Liability: \$1,000,000.00

.2 Comprehensive General Liabilities (including Premises-Operations; Independent Contractors' Protective; Products and Completed Operations; Broad Form Property Damage and Elevator Liability):

Bodily Injury: \$2,000,000.00 Each Occurrence
\$2,000,000.00 Annual Aggregate
Property Damage: \$2,000,000.00 Each Occurrence
\$2,000,000.00 Annual Aggregate

Products and Completed Operations to be maintained for one year after final payment.
Property Damage Liability Insurance including XCU coverage.

.3 Contractual Liabilities:

Bodily Injury: \$ 2,000,000.00 Each Occurrence
\$ 2,000,000.00 Annual Aggregate
Property Damage: \$ 2,000,000.00 Each Occurrence
\$ 2,000,000.00 Annual Aggregate

.4 Personal Injury: \$ 2,000,000.00 Each Occurrence
\$ 2,000,000.00 Annual Aggregate

.5 Comprehensive Automobile Liability: including owner, non-owned, hired, leased or rented vehicles.

Bodily Injury: \$1,000,000.00 Each Person
\$1,000,000.00 Each Occurrence
Property Damage: \$100,000.00 Each Occurrence
\$1,000,000.00 Annual Aggregate

.6 Professional Errors and Omissions: to cover damages resulting from errors or omissions of the engineers and/or architects on the Design/Builder's project team.

\$1,000,000.00 Each Occurrence
\$1,000,000.00 Annual Aggregate

.7 Umbrella Policy: \$2,000,000 limit for a combined single limit

All such policies of insurance shall remain in force through the one (1) year warranty period of final completion and payment of the Work.

7.1.3 The Design/Builder's liability insurance shall include contractual liability insurance applicable to the Design/Builder's obligations under Paragraph 11.7.

7.1.4 Prior to or upon execution of Contract Documents, Design/Builder shall submit to the Owner a certificate of insurance, and if requested, copies of policies, acceptable to the Owner. These Certificates, as well as insurance policies required by this Paragraph, shall contain a provision that coverage will not be canceled, modified or allowed to expire until at least thirty days' prior written notice has been given to the Owner. If any of the insurance coverages under this Agreement are required to remain in force after final payment, an additional certificate evidencing continuation of such coverage shall be submitted along with the application for final payment. The form of the certificate shall be AIA Document G705.

7.1.5 The Design/Builder shall include all contractors and subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each contractor and subcontractor. All coverages for contractors and subcontractors shall be subject to all of the requirements stated herein with the exception of professional liability insurance stated in Paragraph 7.1.7

7.1.6 The Design/Builder's Engineers, Testing Consultants and any other party engaged by the Design/Builder to provide services shall carry professional liability insurance in the amount of \$1,000,000.00 single limit per occurrence. Certificates shall be provided including a description of services covered by the insured party on the Project.

7.1.7 Any deductibles or self-insured retentions must be declared to and approved by the Owner. At the option of the Owner either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Owner, its officers, officials and employees; or, the Design/Builder shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

7.2 PROPERTY INSURANCE

7.2.1 The Design/Builder shall purchase and maintain in a company lawfully authorized to do business in the State of Georgia property insurance in the amount of the contract sum as well as subsequent modifications. Such property insurance shall be maintained unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance until final payment has been made or until no person or entity other than the Owner has an insurable interest in the property required to be covered whichever is earlier. This insurance shall include interest of the Owner, the Design/Builder, Subcontractors, and Subs-Subcontractors in the Work.

7.2.2 The type of policy shall be a Builder's Risk in the amount of the contract sum as well as subsequent modifications and shall be on an all-risk policy form. Owner shall be listed as a Loss Payee under this insurance. The Design/Builder shall secure all-risk type of builder's risk insurance covering work performed under the Contract, and materials, equipment, expedited deliveries or other items to be incorporated therein, while the same are located at the construction site, stored off-site, or at the place of manufacture. The policy shall cover not less than losses due to fire, flood, explosion, hail, lightning, weather, vandalism,

malicious mischief, wind, collapse, riot, aircraft, smoke or other cataclysmic events, until the date of final acceptance of the work.

The making of progress payments to the Design/Builder shall not be construed as relieving the Design/Builder or his subcontractors or the insurance company or companies providing the coverage described herein of responsibility for loss or direct physical loss, damage or destruction occurring prior to final acceptance.

7.2.3 The form of policy for this coverage shall be Completed Value.

7.2.4 If the Owner is damaged by the failure of the Design/Builder to maintain such insurance, then the Design/Builder shall bear all costs properly attributable thereto.

7.3 OTHER INSURANCE PROVISIONS

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

7.3.1.1 General Liability and Automobile Coverage

The Owner, its officers, officials, employees, and volunteers are to be covered as additional named insureds as respects liability arising out of activities performed by or on behalf of the Design/Builder; products and completed operations of the Design/Builder; premises owned, occupied or used by the Design/Builder; or automobiles owned, leased, hired or borrowed by the Design/Builder.

7.3.1.2 Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the Owner, its officers, officials, employees, or volunteers.

7.3.1.3 The Design/Builder's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

7.3.1.4 Workers' Compensation and Employers' Liability Coverage

The insurer shall agree to waive all rights of subrogation against the Owner, its officers, officials, employees, and volunteers for losses arising from work performed by the Design/Builder for the Owner.

7.4 LOSS OF USE INSURANCE

7.4.1 The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Design/Builder, the Design/Builder's contractors, and their agents and employees, for loss of use of the Owner's property, including consequential losses due to fire or other hazards, however caused, to the extent covered by insurance under this Paragraph 7.4.

7.5 PERFORMANCE BOND AND PAYMENT BOND

7.5.1 Prior to the execution of the Agreement, the Design/Builder shall:

.1 Furnish a contract performance bond and a payment bond executed by a surety company. This company must be listed in the latest issue of U.S. Treasury Circular 570, registered, and duly authorized to do business in the State of Georgia. The bond must be signed (or countersigned) by a local agent, each in an amount that is at least equal to one-hundred percent (100%) of the Contract Price, as security for the faithful performance of this contract and as security for the payment of all persons performing labor and furnishing material in connection with the Contract. The surety shall be acceptable to the Owner and the bonds shall be executed on the County's bond forms attached hereto as Exhibits "A" and "B". In case of default on the part of the Design/Builder, all expenses incident to ascertaining and collecting losses under the bond, including both engineering and legal services, shall lie against the bond.

.2 Bonding of Subcontractors: include in the Base Bid, Performance and Labor and Material Payment Bonds, each in 100% of the sub-contract sum, for each subcontractor having a contract exceeding One Hundred Thousand Dollars (\$100,000.00). Should Owner elect not to require bonds for particular Subcontractors, bond costs shall revert back to the Owner. The Design/Builder and Subcontractor shall require the Attorney-In-Fact who executes the bonds on behalf of sureties to attach a certified, current copy of his Power of Attorney.

.3 Provide the Owner a one-year guarantee covering workmanship and materials of the project, or as provided for in the Specifications. The contract performance bond shall remain in force for 90 days from date of project acceptance by the Owner. The cost of this bond shall be paid by the Design/Builder.

8.0 CHANGES IN THE WORK

8.1 CHANGE ORDERS

8.1.1 A Change Order is a written order signed by the Owner and Design/Builder, and issued after execution of this Agreement, authorizing a change in the Work or adjustment in the contract sum or contract time. The contract sum and contract time will only change by Change Order.

8.1.2 The Owner, without invalidating this Agreement, may order changes in the Work within the general scope of this Agreement consisting of additions, deletions, or other revisions, and the contract sum and contract time shall be adjusted accordingly. Such changes in the Work shall be authorized by Change Order, and shall be performed under applicable conditions of the Contract Documents.

8.1.3 The Owner may, within reason, request the Design/Builder to submit a proposal for a change in the Work and then elect not to proceed with the change. This shall result in no additional cost to the Owner.

8.1.4 Cost or credit to the Owner resulting from a change in the Work shall be determined in one or more of the following ways:

- .1 by mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation.
- .2 by unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 by cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 by the method provided below.

8.1.5 If none of the methods set forth in Paragraph 8.1.4 in clauses .1, .2 or .3 is agreed upon. The Owner may elect to issue the Change Order to the Design/Builder directing such work to be performed by the Design/Builder, and any adjustments to Price or time shall be subject to ultimate determination in accordance with this Agreement; and the Design/Builder shall, nonetheless, proceed immediately with the changed Work. The Design/Builder shall keep a detailed account of the direct savings and direct cost due to the changed Work separately from its other accounting records and shall make such records available to the Owner at the Owner's request. Failure to keep adequate and separate cost records of the changed Work, and to furnish same to the Owner upon its request, shall constitute an acceptance on the Design/Builder's part of the Owner's determination of the direct savings and direct cost of such changed Work. In no event shall the Design/Builder proceed with changed Work without a Change Order issued pursuant to this Paragraph 8.1.5. The Owner shall not be liable for any additional costs incurred or delays encountered in the performance of such changed Work without such a written Change Order. In case of the methods set forth in Paragraph 8.1.4 clauses .3 and .4, the Design/Builder shall keep and present an itemized accounting together with appropriate supporting data for inclusion in a Change Order. Unless otherwise provided in the Contract Documents, cost shall be limited to the following: cost of materials, including sales tax and cost of delivery; cost of labor, including social security, old age and unemployment insurance. As well as fringe benefits required by agreement or custom; workers' or workman's compensation insurance; bond premiums; rental value of equipment and machinery; and fees paid to engineers and other professionals. Pending final determination of cost to the Owner, payments on account shall be made on the Application for Payment. The amount of credit to be allowed by the Design/Builder to the Owner for deletion or change which results in a net decrease in the contract sum will be actual net cost. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any, with respect to that change.

8.1.6 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are so changed in a proposed Change Order that application of agreed unit prices to quantities proposed will cause substantial inequity to the Owner, applicable unit prices shall be equitably adjusted.

8.1.7 In Paragraph 8.1.5 the allowance for overhead and profit combined, included in the total cost to the Owner, shall be based on the following schedule:

.1 For additive Change Orders, the Design/Builder's fee for overhead and profit combined will be increased by seven (7%) percent of the approved direct cost of the additional work performed by its Subcontractors. For the Design/Builder and each Subcontractor involved, the respective party's fee for overhead and profit combined will be increased by fifteen (15%) percent of the approved direct cost of the additional work performed with its own forces.

.2 All Sub-Subcontractor's are considered to have been established solely for the convenience of the Design/Builder and its immediate Subcontractors. To this effect, the allowable Subcontractor overhead and profit amount shall not be derived by compounding the established percentages upon themselves through their Sub-Subcontractors.

.3 For deductive Change Orders, the Design/Builder's fee for overhead and profit will remain unchanged.

.4 For Changes in the Work involving both additive and deductive amounts, the effective cost shall be the net total from the summation of all costs associated with the change. If this cost results in a net add, then subparagraph .1 above shall apply; if the cost is a net deduct, then subparagraph .3 above shall apply. The Design/Builder shall not submit groups of partial Proposals relative to a singular item of Change. Requests for Time Extensions relative to the Change shall be identified in the Proposal.

.5 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also. In no case will a Change involving over One Hundred Dollars (\$100.00) be approved without such itemization.

.6 The Design/Builder shall sequentially number each of his cost change proposals and further identify each proposal as to cause for change.

8.2 CONCEALED CONDITIONS

8.2.1 The Design/Builder acknowledges, by execution of this Contract, that the Design/Builder has included in the compensation all concealed or unknown conditions that affect the performance of the Work and vary from those indicated by the Contract Documents, whether encountered below ground or in an existing structure other than the Work, which conditions are occasionally found to exist or which are generally recognized as possible in work of the character provided for in this Agreement.

8.3 REGULATORY CHANGES

8.3.1 The Design/Builder acknowledges, by execution of this Agreement, that the Design/Builder has included in the compensation all changes in the Work necessitated by the enactment or revision

of codes, laws, or regulations subsequent to signing of the Contract and including those codes, laws, or regulations which are anticipated to be enacted prior to completion of the Work. Contractor shall not be compensated for changes required by inspection officials through completion of the Work for compliance with requirements, which were in force at time of Contract signing or anticipated to be enacted prior to completion whether or not such requirements were noted at time of permit issuance.

9.0 DEFECTIVE WORK

9.1 The Design/Builder shall promptly correct Work rejected by the Owner or known by the Design/Builder to be defective or failing to conform to the Construction Documents. Whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Design/Builder shall specifically warrant all work performed under this Agreement for one year immediately following Substantial Completion. The Design/Builder shall correct Work under this Agreement found to be defective or nonconforming within that one-year period, or within such longer period provided by any applicable special warranty in the Contract Documents.

9.2 Nothing contained in this Section 9 shall be construed to establish a period of limitation with respect to other obligations of the Design/Builder under this Agreement. Paragraph 9.1 relates only to the Design/Builder's warranty, and specific obligation of the Design/Builder to correct the Work. It has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Design/Builder's obligations other than correction of the Work.

9.3 If the Design/Builder fails to correct defective Work as required or, if the Design/Builder persistently fails to carry out Work in accordance with the Contract Documents. Then the Owner, by written order signed personally or by an agent specifically so empowered by the Owner in writing, may order the Design/Builder to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the Owner's right to stop the Work shall not give rise to a duty on the part of the Owner to exercise the right for benefit of the Design/Builder or other persons or entities.

9.4 If the Design/Builder defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within forty-eight (48) hours after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may give a second written notice to the Design/Builder and, seven (7) days following receipt by the Design/Builder of that second written notice and without prejudice to other remedies the Owner may have, the Owner may correct such deficiencies by whatever means the Owner deems expedient. In such case, an appropriate Change Order shall be issued deducting from payments then or thereafter due the Design/Builder costs of correcting such deficiencies. If the payments then or thereafter due the Design/Builder are not sufficient to cover the amount of the deduction, the Design/Builder shall pay the difference to the Owner.

10.0 DISPUTES

10.1 All claims, disputes or other matters in question between the Owner and the Design Builder arising out of or relating to this Agreement or the breach thereof shall be resolved by litigation (and mandated mediation). All action shall be commenced exclusively in a court of competent jurisdiction located in Cobb County, Georgia, it being specifically understood that the Owner and the Design Builder expressly consent to the jurisdiction and venue of any such court.

10.2 The Design/Builder shall continue to proceed with the performance of its obligations under the Agreement and shall maintain the progress of such services during any litigation arising out of this Agreement unless the Owner and the Design Builder shall mutually agree otherwise in writing.

11.0 MISCELLANEOUS REQUIREMENTS

11.1 This Agreement shall be governed and construed in accordance with the laws and court decisions of the State of Georgia.

11.2 The table of contents and the headings of Sections and paragraphs are for convenience only and shall not modify rights and obligations created by this Agreement.

11.3 In case a provision of this Agreement is held to be invalid, illegal, or unenforceable, the validity, legality, and enforceability of the remaining provisions shall not be affected.

11.4 SUBCONTRACTS

11.4.1 Work not performed by the Design/Builder with its own forces shall be performed by Subcontractors or the Architect/Engineer. The Design/Builder, as soon as practicable after execution of this Agreement, shall furnish to the Owner in writing the names of the persons or entities the Design/Builder will engage as contractors for the Project. The Design/Builder shall not retain any subcontractor to whom the Owner has as a reasonable and timely objection. The Design/Builder shall be responsible to the management of the Subcontractors in the performance of the Work.

11.4.2 Nothing contained in the Design/Builder Contract Documents shall create a professional obligation or contractual relationship between the Owner and any third party.

11.4.3 Contingent Assignment of Subcontract. If this Agreement is terminated, each subcontract agreement shall be assigned by the Design/builder to the Owner, subject to the prior rights of any surety, provided that:

.1 this Agreement is terminated by the Owner pursuant to Section ____; and,

.2 the Owner accepts such assignment, after termination by notifying the Subcontractor and Design/Builder in writing, and assumes all rights and obligations of the Design/builder pursuant to each subcontract agreement.

If the Owner accepts such an assignment, and the Work has been suspended for more than thirty (30) consecutive days, following termination, if appropriate, the Subcontractor's compensation

shall be equitably adjusted as a result of the suspension.

11.4.4 Binding of Subcontractors and Material Suppliers. The Design/Builder agrees to bind every Subcontractor and Material Supplier (and require every Subcontractor to so bind its Sub-subcontractors and Material Suppliers) to all the provisions of this Agreement and the Contract Documents as they apply to the Subcontractors and Material Suppliers portions of the Work. Specifically included in this condition is compliance with all terms and conditions of Exhibit C: Special Terms and Conditions of the ARRA and EECBG. Notwithstanding this condition, Contractor shall be responsible for ensuring all work and materials used in performance of this project meet all conditions as required in Exhibit C.

11.5 WORK BY OWNER OR OWNER'S CONTRACTORS

11.5.1 The Owner reserves the right to perform work related to, but not part of, the Project and to award separate contracts in connection with other work at the site. If the Design/Builder claims that delay or additional cost is involved because of such action by the Owner, the Design/Builder shall make such claims as provided in Paragraph 11.6.

11.5.2 The Design/Builder shall afford the Owner's separate contractors reasonable opportunity for introduction and storage of their materials and equipment on the Project site for execution of their work. The Design/Builder shall incorporate and coordinate the Design/Builder's Work with work of the Owner's separate contractors as required by the Contract Documents.

11.5.3 Costs caused by defective or ill-timed work shall be borne by the party responsible.

11.5.4 The Owner shall cause Owner's separate contractors to include the Design/Builder, its officers, employees and agents as additional insureds under its policies of insurance or shall furnish separate certificates and endorsements for the construction of this Project.

11.6 CLAIMS FOR DAMAGES

11.6.1 Should either party to this Agreement suffer injury or damage to person or property because of an act of omission of the other party, the other party's employees or agents, or another for whose acts the other party is legally liable, claim shall be made in writing to the other party within a reasonable time after such injury or damage is or should have been first observed.

11.7 INDEMNIFICATION

11.7.1 To the fullest extent permitted by law, the Design/Builder shall indemnify and hold harmless the Owner and the Owner's consultants and separate contractors, any of their subcontractors, sub-subcontractors, agents and employees from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees and other legal expenses, as well as interest arising out of or resulting from performance of the Work. These indemnification obligations shall be limited to claims, damages, losses or expenses (1) that are attributable to bodily injury, sickness, disease or

death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom, and (2) to the extent such claims, damages, losses or expenses are caused in whole or in part by negligent acts or omissions of the Design/Builder, the Design/Builder's contractors, anyone directly or indirectly employed by either or anyone for whose acts either may be liable, regardless of whether or not they are caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge or otherwise reduce other rights or obligations of indemnity which would otherwise exist as to the party or person described in this Paragraph 11.7.

11.7.2 In claims against the Owner or its consultants and its contractors, any of their subcontractors, sub-subcontractors, agents or employees by an employee of the Design/Builder, its contractors, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Paragraph 11.7 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Design/Builder, or a Design/Builder's contractor, under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

11.8 SUCCESSORS AND ASSIGNS

11.8.1 This Agreement shall be binding on successors, assigns, and legal representatives of and persons in privity of contract with the Owner or Design/Builder. Party shall assign, sublet, or transfer an interest in this Agreement without the written consent of the other.

11.8.2 This Paragraph 11.8 shall survive completion or termination of this Agreement.

11.9 REPLACEMENT OF DESIGN/BUILDER ENGINEER

11.9.1 In case of termination of the Design/Builder's Engineer, the Design/Builder shall provide the services of another lawfully licensed person or entity against whom the Owner makes no reasonable objection and whom shall be in compliance with all requirements of this agreement.

11.10 EXTENT OF AGREEMENT

11.10.1 This Agreement represents the entire agreement between the Owner and Design/Builder and supersedes prior negotiations, representations, or agreements. This Agreement may be amended only by written instrument signed by both Owner and Design/Builder.

11.11 JOINT DRAFTING. The parties to this Agreement expressly agree that this Agreement was jointly drafted, and that both had opportunity to negotiate its terms and to obtain the assistance of counsel in reviewing its terms prior to execution. Therefore, this Agreement shall be construed neither against nor in favor of either party, but shall be construed in a neutral manner.

11.12 Waiver. The failure of either party to insist, in one or more instances, on the performance of any of the terms, covenants, or conditions of this Agreement, or to exercise any of its rights, shall not be construed as a waiver or relinquishment of such term, covenant, condition or right with

respect to further performance.

12.0 TERMINATION

12.1 TERMINATION BY THE OWNER

12.1.1 This Agreement may be terminated by the Owner upon seven (7) days' written notice to the Design/Builder in the event that the Project is abandoned by the Owner. If such termination occurs, the Owner shall pay the Design/Builder for Work completed and for proven loss sustained upon materials, equipment, tools, and construction equipment and machinery, including reasonable profit, but specifically excluding any other special or consequential damages and punitive damages.

12.1.2 If the Design/Builder defaults or persistently fails or neglects to carry out the Work in accordance with the Contract Documents or fails to perform the provisions of this Agreement, the Owner may give written notice that the Owner intends to terminate this Agreement. If the Design/Builder fails to correct the defaults, failure or neglect within seven (7) days after being given notice, the Owner may without prejudice to any other remedy make good such deficiencies and may deduct the cost thereof from the payment due the Design/Builder or, at the Owner's option, may terminate the employment of the Design/Builder and take possession of the site and of all materials, equipment, tools and construction equipment and machinery thereon owned by the Design/Builder and finish the Work by whatever method the Owner may deem expedient. If the unpaid balance of the contract sum exceeds the expense of finishing the Work, the excess shall be paid to the Design/Builder, but if the expense exceeds the unpaid balance, the Design/Builder shall pay the difference to the Owner, and Owner may pursue any other available remedies, at law or in equity, for such default by Design/Builder .

12.1.3 In addition to Paragraph 12.1.2, the following events will be deemed a default by the Design/Builder hereunder:

.1 the entry of a decree or order, either voluntarily or involuntarily, for relief by a court or entity having jurisdiction over the Design/Builder in any action involving bankruptcy, insolvency or other similar law, or the appointment of a receiver, liquidator, assignee, custodian, trustee, or sequestrator (or similar official) of or for the Design/Builder, or the ordering of the winding up or liquidation of the Design/Builder's affairs;

.2 The Design/Builder, in the judgment of the Owner, refuses or fails to supply a sufficient number of skilled workmen and supervisory personnel or suitable materials or equipment for performance of the Work;

.3 The Design/Builder fails to follow the instructions of the Owner directed towards requiring results in conformity to the Agreement;

.4 The Design/Builder disregards any law, ordinance, rule, regulation or order of any public

authority having jurisdiction.

12.2 TERMINATION BY THE DESIGN/BUILDER

12.2.1 If the Owner fails to make payment when due, the Design/Builder may give written notice of the Design/Builder's intention to terminate this Agreement. If the Design/Builder fails to receive payment within thirty (30) days after receipt of such notice by the Owner, the Design/Builder may give a second written notice and, seven (7) days after receipt of such second written notice by the Owner, if Owner has not cured its default, Design/Builder may terminate this Agreement and recover from the Owner payment for Work executed and for proven losses sustained upon materials, equipment, tools, and construction equipment and machinery, including reasonable profit and money damages, but specifically excluding any other special or consequential damages and punitive damages.

12.2.2 The Design/Builder shall have no right to consequential or punitive damages by reason of the Owner's failure to make payment or any acts of the Owner under this Agreement, and the Design/Builder hereby waives any and all rights to consequential or punitive damages.

13.0 BASIS OF COMPENSATION

13.0.1 The Owner shall compensate the Design/Builder in accordance with Section 5, Payments, and the other provisions of this Agreement as described below.

13.1 COMPENSATION

13.1.1 FOR BASIC SERVICES, as described in Paragraphs 2.2.2 through 2.2.17, and for any other services included in Section 14 as part of Basic Services, Basic Compensation shall be as follows:

13.1.2 BASIC COMPENSATION is determined as follows:

Total cost of project is \$XXX,XXX.XX

13.1.3 Owner Allowance. Owner reserves the right to modify the scope of the Basic Services under this Agreement and to correspondingly increase the fees payable hereunder in an amount not to exceed 25% of the Basic Compensation set forth in Section 13.1.2 above.

13.1.4 Guaranteed Maximum Price. In no event shall the total compensation under this Agreement exceed the amount of \$XXX,XXX.XX ("Guaranteed Maximum Price")

At such time as the Owner and the Design/Builder jointly agree, the Design/Builder shall submit a GMP Proposal in a format acceptable to the Owner. Unless the parties mutually agree otherwise, the GMP shall be in the sum of the estimated Cost of the Work, as hereinafter defined, and the Design/Builder's Fee as hereinafter defined. The GMP is subject to modification as provided in Article _____. The Design/Builder will be responsible for paying all costs of completing the Work which exceed the GMP, as adjusted in accordance with this Agreement.

14.0 OTHER PROVISIONS

14.1 The Basic Services to be performed shall be commenced on (DATE XX, XXXX) and, subject to authorized adjustments and to delays not caused by the Design/Builder, Substantial Completion shall be achieved in **(TOTAL NUMBER OF CONSTRUCTION DAYS)(XXX) calendar days.**

14.2 The Design/Builder shall submit an Application for Payment on the Twenty-Fifth (25th) day of each month. The Design/Builder will provide with the Payment Application a line item breakdown of all previous costs to date plus the amount being applied for.

14.3 The Design/Builder's Bid Proposal includes:

All cost for furnishing to Owner all materials, equipment, and supplies for the any costs incurred in the Design and Construction of the HVAC Retrofit for Cobb County Animal Control Building, Purchasing Department Headquarters, and The Arts Place.

14.4 The Special Terms and Conditions of the American Recovery and Reinvestment Act Of 2009 (ARRA) and the Energy Efficiency and Conservation Block Grant (EECBG), attached hereto as Exhibit "C", are made part of this Agreement. Design/Builder shall at all times during this Agreement comply fully with those requirements.

14.5 The Design/Builder will provide the following key individuals for the entire duration of the Project. Key individuals cannot be replaced without written approval of the Owner. The Owner may request that a key individual be replaced by another individual meeting the Owner's approval.

.1 Design/Builder Project Manager: (NAME OF PROJECT MANAGER).

.2 Design/Builder Superintendent: (NAME OF SUPERINTENDENT).

.3 Project Mechanical Engineer: (NAME OF ENGINEER)

.4 Project Structural Engineer: (NAME OF STRUCTURAL ENGINEER)

.5 Project Electrical Engineer: (NAME OF ELECTRICAL ENGINEER)

14.6 Intentionally Omitted.

14.7 IMMIGRATION COMPLIANCE. The Owner and Design/Builder agree that compliance with the requirements of O.C.G.A. §13-10-91 and Rule 300-10-1-02 of the Rules of the Georgia Department of Labor are conditions of this Agreement for the physical performance of services.

The Design/Builder represents that it employs:

_____ 500 or more employees;
_____ 100 or more employees; or
_____ fewer than 100 employees

(Design/Builder must initial appropriate category).

The Design-builder further agrees that its compliance with the requirements of O.C.G.A. §13-10-91 and DOL Rule 300-10-1-.02 is attested to on the executed Design-Builder Affidavit and Agreement attached hereto as **EXHIBIT D**.

If employing or contracting with any subcontractor(s) in connection with this Agreement, Design-builder further agrees;

To secure from the subcontractor(s) such subcontractor(s)' indication of the employee-number category applicable to the subcontractor(s); and

To secure from the subcontractor(s) an affidavit attesting to the subcontractor(s)' compliance with O.C.G.A. §13-10-91 and DOL Rule 300-10-1-.02; such affidavit being in the form attached hereto and referenced as **EXHIBIT D-1**; and

To submit such subcontractor affidavit(s) to the Owner when the subcontractor(s) is retained, but in any event, prior to the commencement of work by the subcontractor(s).

The failure of Design-Builder to supply the affidavit of compliance at the time of execution of this Agreement and/or the failure of Design-Builder to continue to satisfy the obligations of O.C.G.A. §13-10-91 and DOL Rule 300-10-1-.02 as set forth in this Agreement during the term of the Agreement shall constitute a material breach of the contract. Upon notice of such breach, Design-Builder shall be entitled to cure the breach within ten (10) days, upon providing satisfactory evidence of compliance with the terms of this Agreement and State law. Should the breach not be cured, the Owner shall be entitled to all available remedies, including termination of the contract and damages.

14.8 COMPLIANCE WITH O.C.G.A. § 36-60-13. Owner and Design/Builder agree that this Agreement is subject to the terms of O.C.G.A. § 36-60-13. In accordance with such provision, this Agreement is for a term of one year and shall terminate absolutely and without further obligation on the part of Owner at the close (December 31) of the calendar year in which it was executed and at the close (December 31) of each succeeding calendar year for which it may be renewed, unless earlier terminated as provided in this Agreement, or renewed as provided herein. This Agreement will automatically renew at 12:01 January 1 of the following calendar year unless the Owner notifies the Design/Builder in writing at least thirty (30) days prior to termination that the Agreement will not be renewed. Further, this Agreement will terminate immediately and absolutely at such time as appropriated or otherwise unobligated funds are no longer available to satisfy the obligation of the Owner. This Agreement does not create a debt of the Owner for the payment of any sum beyond the calendar year of execution or in the event of renewal, beyond the calendar year of such renewal.

14.9 CONFLICT OF INTEREST AFFIDAVIT. Design/Builder agrees, and shall execute an affidavit in the form as attached hereto as **Exhibit E** attesting that, to the best of its knowledge no circumstances exist that will cause a conflict of interest in performing services for Owner, that no employee of Owner, nor any public agency official or employee affected by this Agreement has any pecuniary interest in the business of this firm, associates or consultants of this firm, or the firm's parent firm, subsidiary, or other legal entity of which this firm is a part, and that no person associated with or employed by this firm has any interest that would conflict in any way, manner or degree with the performance of services for Owner.

14.10 NON-COLLUSION AFFIDAVIT. Owner and Design/Builder acknowledge that the Georgia statute concerning public works construction contracting requires that any person who procures such work by bidding or proposal shall make an oath in writing that he/she has not prevented or attempted to prevent competition in such bidding [OCGA § 36-91-21(d),(e)]. In compliance with O.C.G.A. § 36-91-21(d),(e) Design/Builder shall make the oath and complete an affidavit in the form as attached hereto as **Exhibit F** . If such oath is false, this agreement shall be void, and all sums paid by the Owner on the Agreement may be recovered by appropriate action.

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

OWNER
Cobb County
100 Cherokee Street
Marietta, Georgia 30060

DESIGN/BUILDER
(COMPANY NAME)
(ADDRESS)
Atlanta, Ga. 30308
CONTRACTOR # _____

By: _____
G.W. Thompson, Jr, Vice Chairman
Cobb County Board of Commissioners

By _____
NAME
TITLE

Attest: _____
County Clerk

Attest: _____
Title: Corporate Secretary

Approved as to Form:

County Attorney

EXHIBIT A
PAYMENT BOND

Bond Number: _____

KNOW ALL MEN BY THESE PRESENTS, that we, _____ as Principal, hereinafter called "Contractor", and _____, a corporation duly organized under the laws of the State of _____ listed in the latest issue of U.S. Treasury Circular 570, and registered in State of Georgia, as Surety, hereinafter called "Surety", are held and firmly bound unto Cobb County, Georgia, hereinafter called "Owner", in the sum of _____ (in words), (\$ _____) (in figures), for the payment of which sum, well and truly to be made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Contractor has entered into a written contract dated _____, 20____ with the Owner for performance of _____ in accordance with drawings and/or specifications prepared by or for Cobb County which contract is by reference made a part of this bond by reference as if fully set forth herein, and is hereinafter referred to as the Contract.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

A. A claimant is defined as an entity having a direct contract with the Contractor or with a Subcontractor of the Contractor for labor, material, or both, used or reasonably required for use in the performance of the Contract, "labor and material" being construed to include but not limited to that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

B. The Contractor and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be due claimant, and have execution thereon. The Owner shall not be liable for the payment of any judgment costs or expenses of any such suit.

C. No suit or action shall be commenced hereunder by any claimant,

1. Unless claimant, other than one having a direct contract with the Contractor, shall have given written notice to any two of the following: the Contractor, the Owner, or the Surety above-named, within ninety (90) days after such claimant did or performed the

last of the work of labor, or furnished the last of the materials for which said claim is made, stating with substantial specifics and accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Contractor, Owner and/or Surety, at the addresses provided in the Contract or in this bond, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

2. After one (1) year from the completion of Contract and the acceptance by Owner of the work there under, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

3. Other than in a state court of competent jurisdiction in and or the county or of the state in which the project, or any part thereof, is situated.

D. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed on record against said improvement, whether or not claim for the amount of such presented under and against this bond.

E. PROVIDED FURTHER, that the said Surety, for value received hereby, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed there under or the specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

IN WITNESS WHEREOF, this instrument is executed in three (3) counterparts, each one of which shall be deemed an original, this ____ day of _____, 2010.

Principal/Contractor

Signature

Typed Name

Title

Attest:

By: _____
(SEAL)
Surety

Signature of Attorney-in-Fact

Typed Name of Attorney-in-Fact

(Bond must not be dated prior to date of Agreement)

(SEAL)

EXHIBIT B
PERFORMANCE BOND

Bond Number: _____

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned as Principal, hereinafter called "Builder", and _____, a corporation duly organized under the laws of the State of _____, listed in the latest issue of U.S. Treasury Circular 570, and registered in the State of Georgia, as Surety, hereinafter called "Surety", are held and firmly bound unto Cobb County, Georgia, hereinafter called "Owner", in the sum of _____ (in words), (\$ _____)(in figures), for payment of which sum, well and truly to be made, the Builder and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Builder has entered into a written contract dated _____, 20____ with Owner for the construction of _____ in accordance with drawings and/or specifications prepared by or for Cobb County which contract is made a part of this bond by reference as if set forth herein and is hereinafter referred to as the "Contract."

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Builder shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

PROVIDED, FURTHER, that Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed there under or the specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work or to the specifications.

Whenever Builder shall be, and declared by Owner to be in default under the Contract, the Owner, having performed Owner's obligations there under, the Surety may promptly remedy the default, or shall promptly:

1. Complete the Contract in accordance with its terms and conditions; or,
2. Obtain a bid or bids for completing the Contract in accordance with its terms, and conditions, and upon determination by the Owner and the Surety jointly of the responsible and responsive bidder, arrange for a contract between such bidder and

Owner, and make available as work progresses (even though there should be default or a succession of defaults) under the contract or contracts of completion arranged under this paragraph sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof.

The term "balance of the contract price", as used in this paragraph, shall mean the total amount payable by Owner to Builder under the Contract and any amendments thereto, less the amount paid by Owner to Builder.

Any suit under this Bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due. Notwithstanding the above, in the event of failure by the Builder to perform its obligations under said contract, the Owner may provide written notice of Builder's default to Surety at its address _____ and Surety shall cause to be paid within ten (10) days of receipt of Owner's notice such amount certified by Owner to be owing from Builder pursuant to the Contract.

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 heirs, executors, administrators or successors of the Owner.

The Surety may only cancel this bond by first providing thirty (30) days written notice to Owner and Builder. Such cancellation shall not discharge the Surety from liability already accrued under this bond prior to the expiration of the thirty (30) day period.

IN WITNESS WHEREOF, this instrument is executed in four (4) counterparts, each one of which shall be deemed an original, this _____ day of _____, 20_____.

Attest:

By: _____

Attest:

By: _____

PRINCIPAL/BUILDER (SEAL)

Signature

Typed Name

President

Title

Surety (SEAL)

Signature of Attorney-in-Fact

Typed Name of Attorney-in-Fact

EXHIBIT C
SPECIAL TERMS AND CONDITIONS OF THE AMERICAN RECOVERY AND
REINVESTMENT ACT OF 2009 (ARRA) AND THE ENERGY EFFICIENCY AND
CONSERVATION BLOCK GRANT (EECBG)

EXHIBIT D
CONTRACTOR AFFIDAVIT & AGREEMENT

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 contracting with Cobb County, Georgia, has registered and is participating in a federal work authorization program* (an electronic verification of work authorization program operated by the U.S. Department of Homeland Security or any equivalent federal work authorization program operated by the U.S. Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA)), in accordance with the deadlines established in the referenced statute.

The undersigned further agrees that should it employ or contract with any subcontractor(s) for the physical performance of services pursuant to the contract with Cobb County, Georgia, the contractor will secure from the subcontractor(s) verification of compliance with O.C.G.A. § 13-10-91 on the attached Subcontractor Affidavit. (EXHIBIT A). The contractor further agrees to maintain records of such compliance and shall provide a copy of each such verification to Cobb County, Georgia, at the time the subcontractor(s) is retained to perform such services.

By: Authorized Officer or Agent
[Contractor Name]

Date

Printed Name

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE ____ DAY OF _____, 2010_

Notary Public
My Commission Expires:

*The applicable federal work authorization program as of the effective date of the statute is the Basic Pilot program of the Systematic Alien Verification for Entitlements (SAVE) Program Office of U.S. Citizenship and Immigration Service (USCIS).

EXHIBIT D-1
SUBCONTRACTOR AFFIDAVIT

By executing this affidavit, the undersigned subcontractor 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 Cobb County, Georgia, has registered and is participating in a federal work authorization program* (an electronic verification of work authorization program operated by the U.S. Department of Homeland Security or any equivalent federal work authorization program operated by the U.S. Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA)), in accordance with the deadlines established in the referenced statute.

By: Authorized Officer or Agent
[Contractor Name]

Date

Printed Name

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE ____ DAY OF _____, 2010_

Notary Public
My Commission Expires:

*The applicable federal work authorization program as of the effective date of the statute is the Basic Pilot program of the Systematic Alien Verification for Entitlements (SAVE) Program Office of U.S. Citizenship and Immigration Service (USCIS).

EXHIBIT E
CONFLICT OF INTEREST AFFIDAVIT

As a duly authorized representative of the firm _____ I, _____
_____ with the title _____ certify that to the best of my knowledge no
circumstances exist that will cause a conflict of interest in performing services for Cobb
County Government, that no employee of Cobb County, nor any public agency official or
employee affected by this Request for Proposals has any pecuniary interest in the business of
this firm, associates or consultants of this firm, or the firm's parent firm, subsidiary, or other
legal entity of which this firm is a part, and that no person associated with or employed by this
firm has any interest that would conflict in any way, manner or degree with the performance of
services for Cobb County Government.

Date: _____

Company Name: _____

Authorized Representative Name: _____

Title: _____

Signature: _____

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE ____ DAY OF _____, 2010_

Notary Public

My Commission Expires:

EXHIBIT F
NON-COLLUSION AFFIDAVIT

As a duly authorized representative of the firm involved in the bidding for or procuring the contract for the construction of the _____ for Cobb County, Georgia, _____ with the title _____ certify that I did not prevent or attempt to prevent competition in such proposals by any means whatsoever. Nor did I prevent or endeavor to prevent anyone from making a proposal therefore by any means whatsoever, or induce another to withdraw a proposal for the work.

Date: _____

Company Name:

Authorized Representative Name: _____

Title: _____

Signature: _____

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE ____ DAY OF _____, 2010_

Notary Public

My Commission Expires: